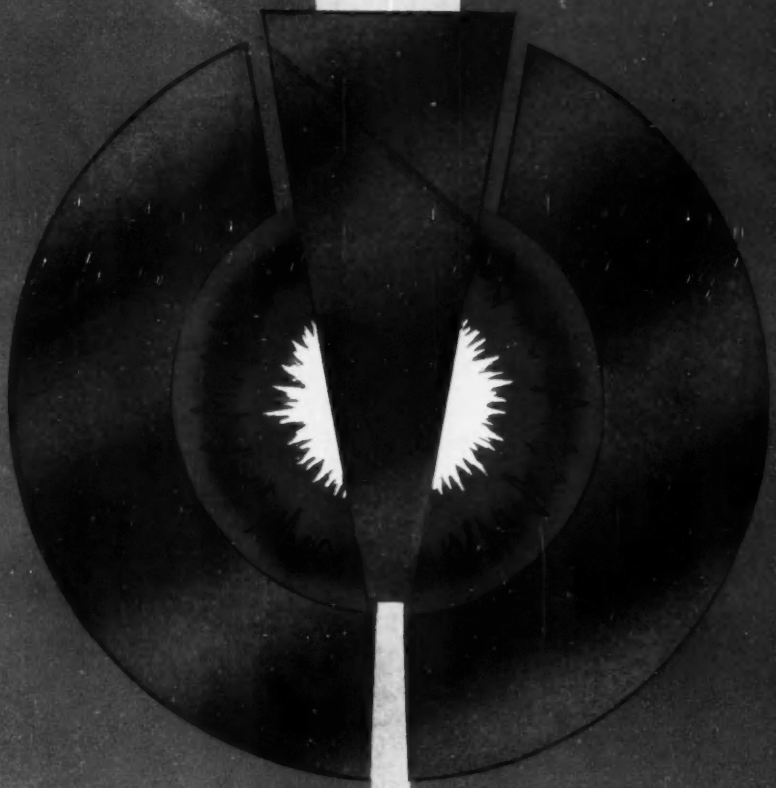
# AUTOMOTIVE INDUSTRIES

APRIL 15, 1949



## IN THIS ISSUE

Geneva International Automobile Show
Cummins V-12 Diesel of 550 Hp
Rochester's New Production Facilities
First Article of Automatic Transmission Series

A CHILTON PUBLICATION

New Heald Centerless Internal

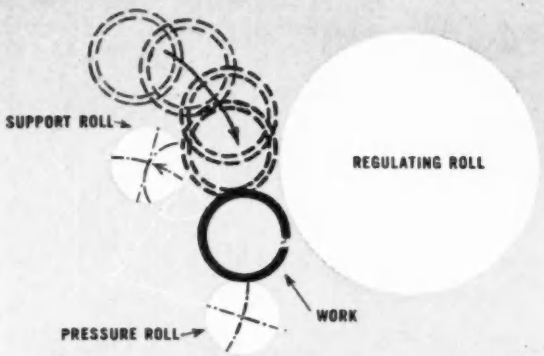
# LOADS AND UNLOADS IN ONE SECOND !

## ...new development speeds up your centerless grinding cycle

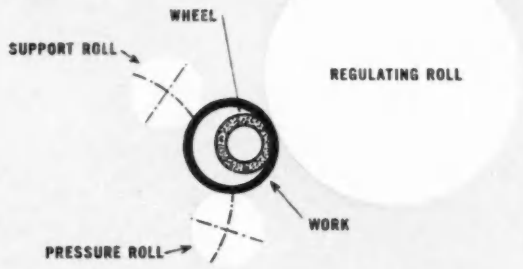
If you are grinding work that can be rotated on its own outside diameter, you are probably already familiar with the centerless principle of internal grinding—an exclusive Heald development. Today, on the Heald Model 181 Centerless, this principle has been further refined by a new method of still faster loading and unloading.

The diagrams at the right show how the work is fed into grinding position, and automatically unloaded by gravity. The entire loading and unloading operation has been reduced to one second! This means that the 181 spends less time grinding air. It also means that the entire grinding cycle may be shortened by as much as 15%.

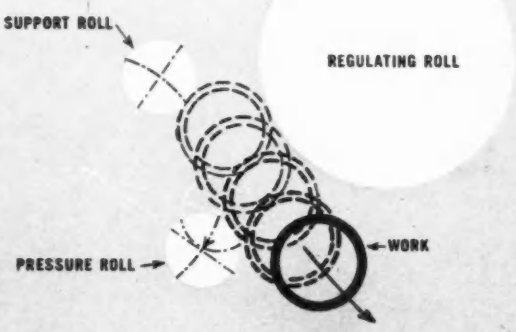
This new development is typical of the production-minded engineering back of every time-saving, effort-saving feature of the new Heald machines. Your nearest Heald representative will be glad to study your precision finishing problems and recommend the right machine for the job.




**LOADING.** At the start of each cycle, the upper support roll shifts to the left, allowing the part to drop into place between the pressure roll and the regulating roll.




**GRINDING.** The support roll then moves back to the right, into the grinding position, accurately locating the part, which is rotated on its own O.D. between the three centerless rolls.




**UNLOADING.** As soon as the grinding operation is completed, the pressure roll shifts to the left, allowing the work to drop down into the unloading chute. The pressure roll instantly moves back into position and the cycle is repeated.

HEALD

PRECISION INTERNAL AND SURFACE GRINDERS

PRECISION BORE-MATIC FINISHING MACHINES

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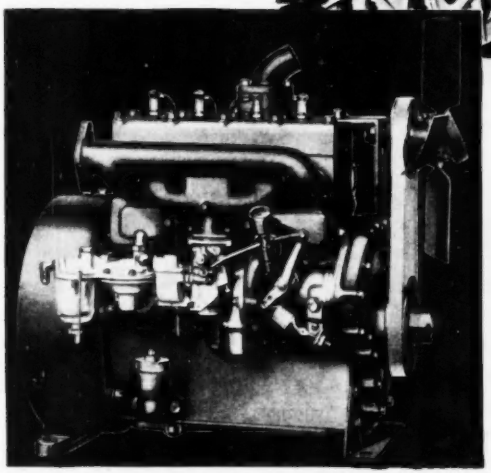
# PULLING POWER FOR *PANTHERS*

## put up in a small package



**WAUKESHA ENGINE Model ICK**—4 cylinders, 2½-in. bore x 3½-in. stroke. 61 cu. in. displacement.

● Panther Tractor Corp., Garland, Dallas County, Texas, build their new Panther closer to the ground to do a better job in the orchards and elsewhere, too. It has 3 forward speeds, and reverse—and they wanted a power plant that's exceptionally smooth and responsive . . . low in weight, yet rugged in construction for stamina . . . high in fuel economy. All put up in a small package! The cleverly compact Model ICK Waukesha Engine has about two-thirds the weight of most engines of equal horsepower. Its iron box-type crankcase is light but sturdy. Connecting rods and crankshaft are drop-forged steel, heat treated, with precision type replaceable rod bearings. Two large, annular ball bearings support the shot blasted crankshaft. It has a built-in Waukesha governor. Get the details in *Bulletin 1125.*

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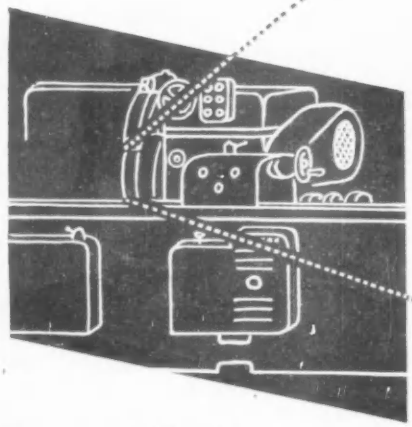
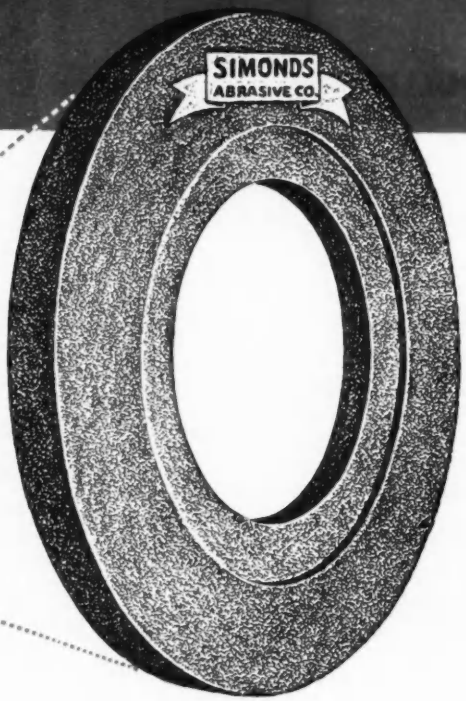
**NEW YORK • TULSA • LOS ANGELES**

# WAUKESHA ENGINES

SIMONDS
ABRASIVE CO.
PHILADELPHIA, PA.

Grinding Wheels



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**For high quality precision grinding . . . for fast, accurate work, minimum dressing and long wheel life.**

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# AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

April 15, 1949 Vol. 100, No. 8


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1

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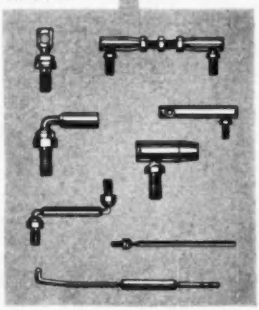

Whether your specifications call for standard or special Ball Joints, you can depend upon Tourek performance, delivery and prices!

Send for your copy of Tourek's 16-page Ball Joint Catalog. It fully describes 12 standard types in 54 sizes (carried in stock), and has data on special types as well.

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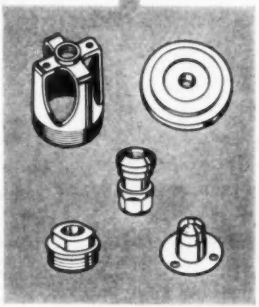
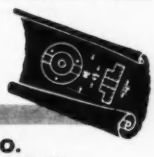


For prompt quotation on your screw machine products requirements, simply send blueprint or sample.



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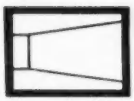

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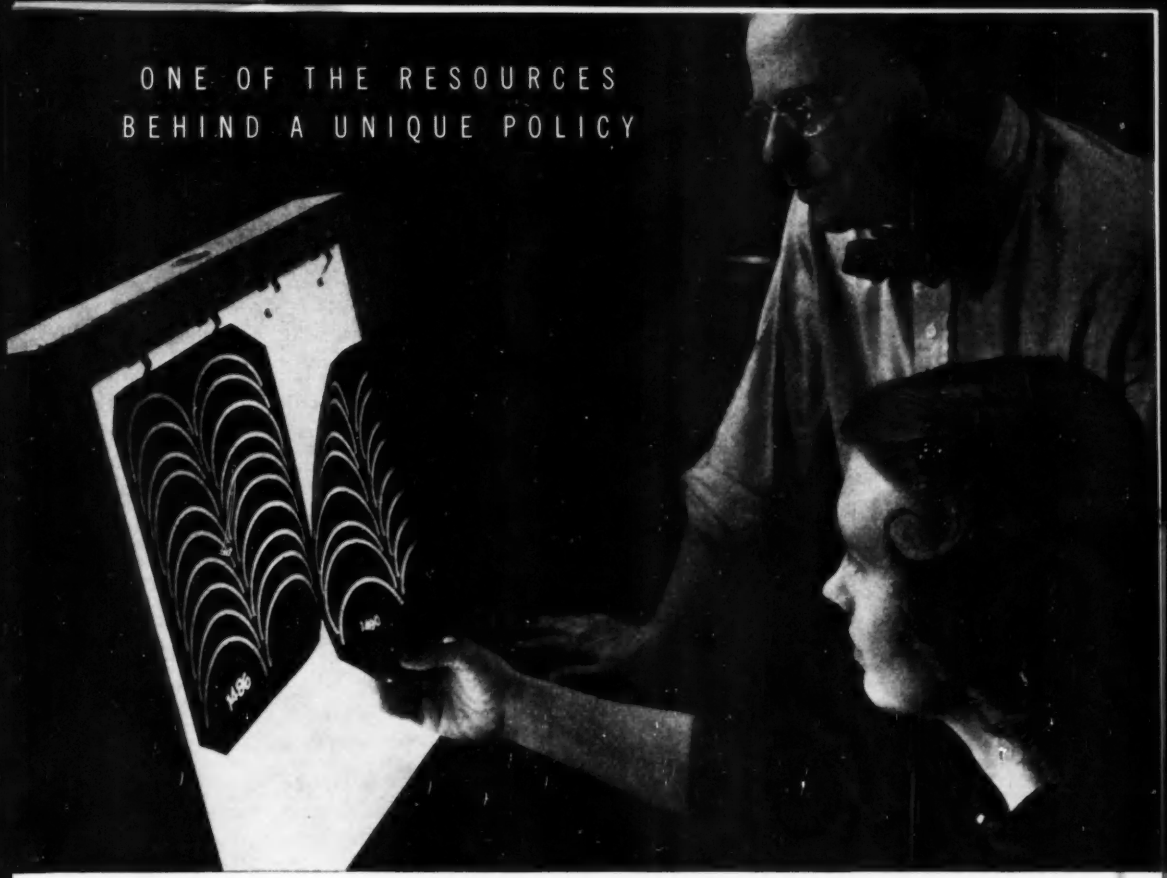
BEHIND A UNIQUE POLICY



## WHAT GOES ON INSIDE?

In the illustration above, a radiograph, or x-ray photograph of eight sections of piston ring castings is being examined for internal flaws.

"Looking through" piston ring castings in this way enables Muskegon to determine the best methods of gating to assure soundness and freedom from internal flaws in the finished rings.

To apply the latest techniques of industrial radiography Muskegon maintains a 150-kilovolt x-ray machine in its foundry metallurgical laboratory.

This equipment is but one of the rich resources, in both plant and personnel, that stand behind Muskegon's *unique policy*.

**Policy**

*"It is Muskegon's firmly established policy to sell exclusively to manufacturers (1) for installation as original equipment and (2) for resale for service purposes."*

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PLANTS AT MUSKEGON AND SPARTA

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ENGINEERED TO YOUR EXPECTATIONS

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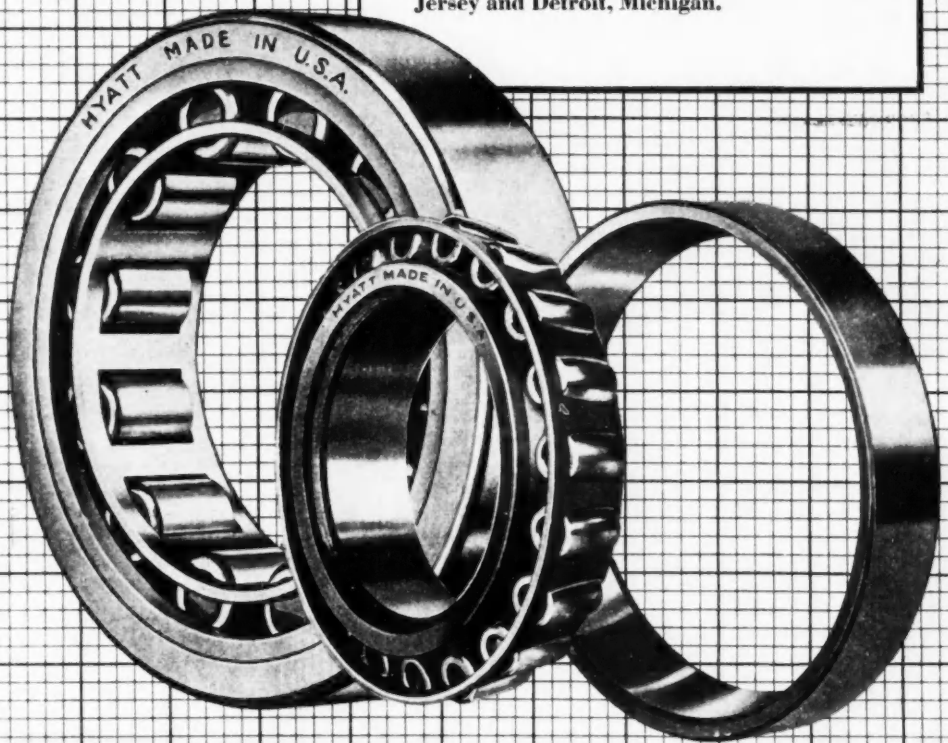


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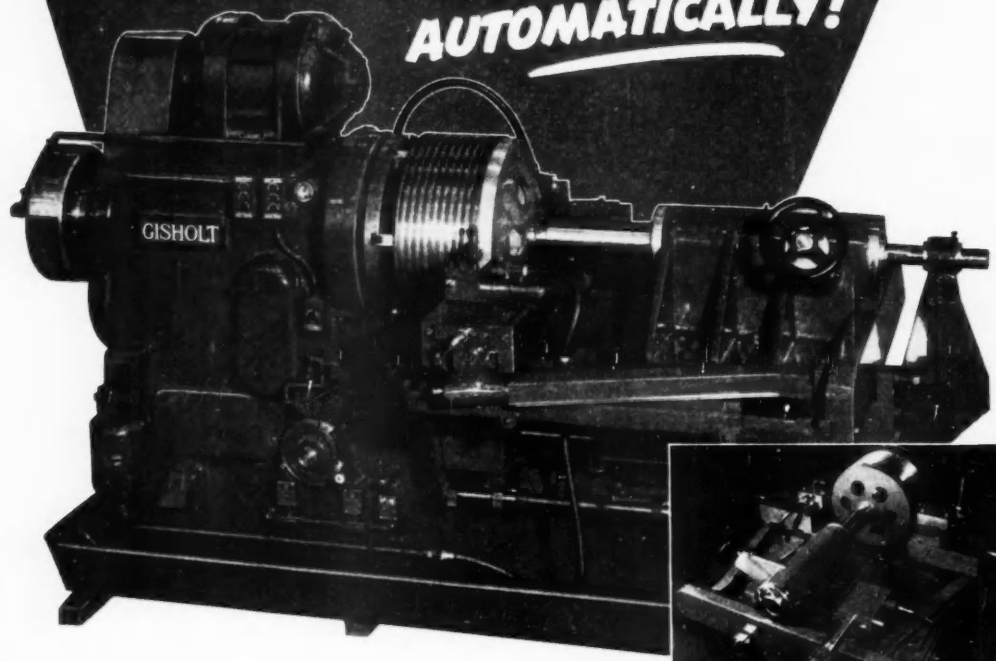


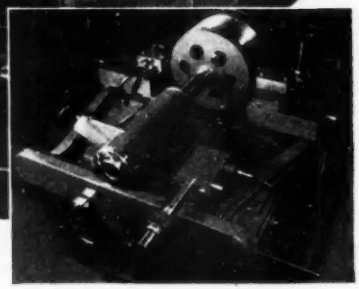

*Automatic pawl fitting into notched bar sets groove position. A single tool bit on the front slide roughs, while the tool bit on the rear slide finish forms. At end of cut, table is automatically repositioned for next groove. Spindle stops and table retracts automatically at end of job.*

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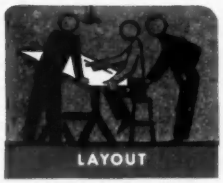

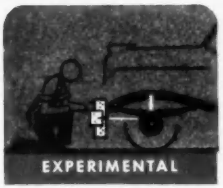

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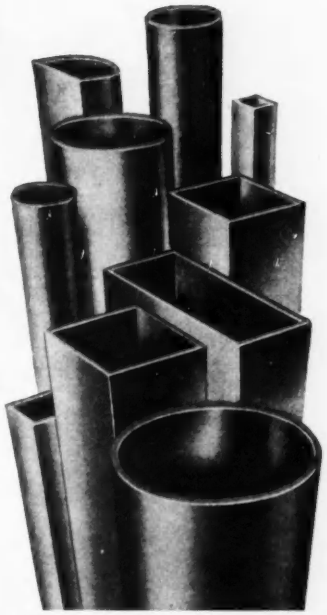

You've asked for J&L *Electricweld* Tubing in shapes. Now you can get them in a wide range of sizes—squares, rectangles, ovals and other special shapes.

***USE*** the structural advantages of J&L Electricweld Tubing to strengthen and lighten the weight of your products.

***USE*** the quality-controlled surface of J&L *Electricweld* Tubing to obtain *better, smoother* finishes.

***USE*** J&L's experience in tubing design and manufacture to help you select the best sections and to determine the most practical tolerances that will give you the lowest possible cost.

There's nothing more versatile than a tube. There's no tubing better than J&L *Electricweld* Tubing.

Let us send you the booklet: "J&L ELECTRICWELD TUBING *for more strength with less weight.*" The coupon is for your convenience.

Jones & Laughlin Steel Corporation
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Pittsburgh 19, Pa.

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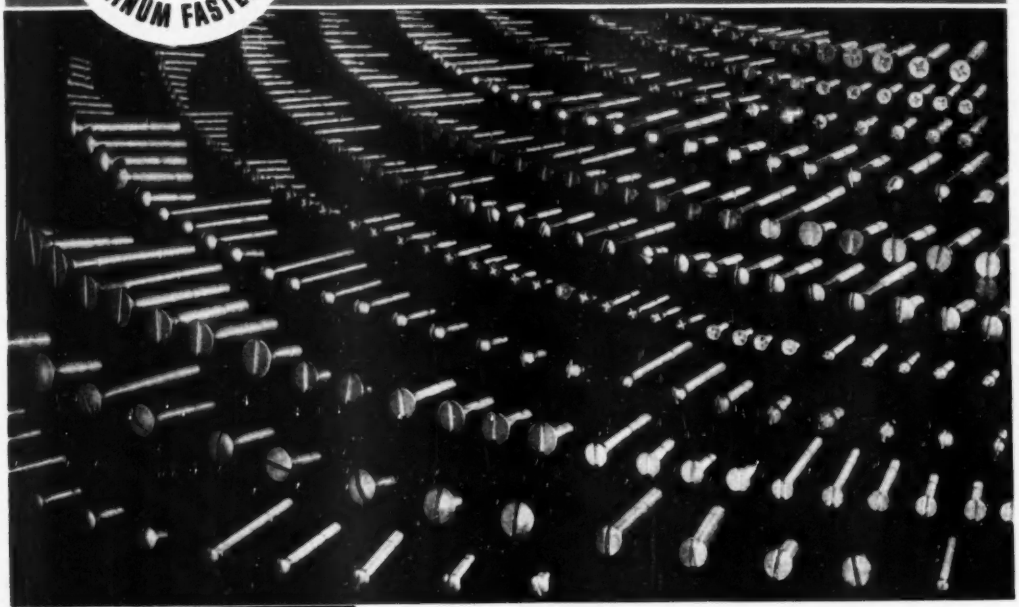

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AUTOMOTIVE INDUSTRIES

The Authoritative Technical and News Magazine That Gives Comprehensive Coverage, Domestic and Foreign, of These Industries:

| | | |
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| Truck | Body | Accessory |
| Bus | Trailer | Production Equipment |
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AUTOMOTIVE INDUSTRIES

Reg. U. S. Pat. Off

# High Spots of This Issue

## 77 Makes of Cars at Geneva International Salon

The 19th International Automobile Salon inaugurated March 17 at Geneva featured 77 makes of cars from 8 nations. This special account for AUTOMOTIVE INDUSTRIES reports on and illustrates a number of models represented, and appraises their improvements over last year's showings. See page 25.

## Complete Change-Over to Carburetors and Tubing

The Rochester Products Division of General Motors has become one of the world's leading producers of small-diameter steel tubing following a complete metamorphosis from former manufacture of electrical equipment. How the Division is being equipped also for big-volume production of a new type carburetor is divulged in detail beginning page 30.

## Automatic Transmissions

This first in a series of articles on modern automatic transmissions traces this engineering development from the little known Sturtevant Unit of 1904 to the present time. The new Packard automatic transmission will be described in the May 1 issue, followed by analyses of current automatic transmissions in future issues. Start this informative series, this issue, on page 34.

## Cummins Introduces New High Power V-12 Diesels

Specifications and descriptions of three new Diesel engines announced by the Cummins Engine Co., Inc., Columbus, Ind., are given in this account appearing on page 37.

## Induction Heating Applications in Making Tractor Parts

This article gives the experience of the International Harvester Co. regarding applications of induction heating to forging, hardening, tempering, brazing, soldering and shrinking operations in the manufacture of tractor parts at the company's new Louisville Works, Ky., where induction heating methods have been utilized to the limit. Turn to page 42.

## 30 New Product Items And Other High Spots, Such As:

An improved engine balancer now employed at the Buick Motor Div.; a report showing continuation of a strong farm machinery market; a picture story of $150,000 worth of hot rods displayed at the Los Angeles hot rod show; specification chart of all German trucks, 1948-1949; and French automobile production for 1948.

*News of the Automotive Industries, Page 17*
*For Complete Table of Contents, See Page 3*

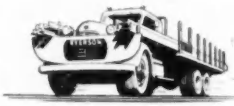
# ENOUGH STEEL?

## The Time to Watch Inventories May Be Now

Informed opinion holds that the time may be near when industry must again show caution in the control of steel inventories. In fact, for some types of steel that time has already arrived.

It's all too easy for this important fact to escape notice until too late. Because of abnormal demand the problem of excess steel inventories has been no problem at all for several years. Now there are signs of a change. The situation is still uncertain and some steels remain critical. But when the turn comes, even today's "normal" inventories may loom large.

As warehouse stocks improve, you can safely extend a conservative buying policy over an increasing variety of steel requirements. Warehouse stocks serve as your steel inventory reserve, allowing you to keep your own inventory at a practical working level. Thus you avoid the continued tie up of capital and minimize the risk of an inventory loss.



The Ryerson organization is particularly well equipped to work with you in keeping your inventory streamlined. Each of thirteen Ryerson plants has large stocks of carbon, alloy, and stainless steels in spite of some unbalance from a size standpoint. Each is served by high speed cutting and handling facilities—and staffed by experienced steel men.

So don't let changes in product design or market conditions catch you with your inventory too high. Steel overstocks can easily become an expensive luxury. We suggest you watch your inventories and keep in touch with us for your current requirements.

**Joseph T. Ryerson & Son, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco.**

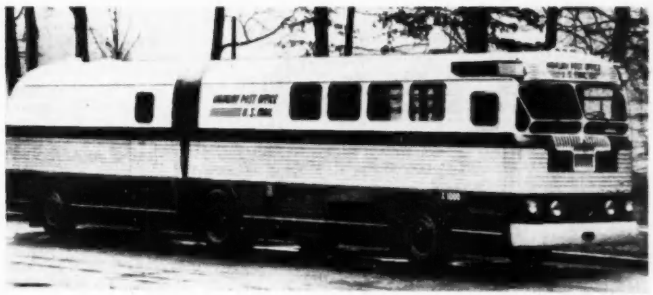
# RYERSON STEEL

# NEWS *of the* AUTOMOTIVE INDUSTRIES

**Vol. 100, No. 8** **April 15, 1949**

### *Automobile Industry Hits 20-Year High in March*

Automobile manufacturers are rapidly approaching a record rate of production. Production in U. S. plants during March was about 520,000 cars and trucks, the highest output for that month since 1929, which was a record year. The feat is even more remarkable considering that Chrysler Corp. which is a volume producer, was plagued consistently during the month by shutdowns due to a supplier's strike, and also by the troubles incident to introducing a new model. Packard also went down late in the month for changeover to the 1950 model which is scheduled for introduction about the first of May. According to the AMA the industry during the first three months of this year turned out more passenger cars than in any comparable period since 1941. During the first week in January, production was about 14,000 cars a day, but by the first of April it had advanced to more than 18,000 a day, or an increase of nearly 30 per cent, and during the next two or three months substantial gains are scheduled. However, one notable difference between production this year and a year ago is that passenger car output is gaining while truck production is either holding its own or dropping. The outlook for trucks is that while production has been holding up a little better than was expected because of the demand for light units, the market will be satisfied for that type by mid-year and total output after that may drop appreciably.



**BIG—BUT IT BENDS**

*Designed by the Twin Coach Co., this new giant SuperTwin truck is the latest addition to the U. S. Post Office's growing fleet of highway post offices. Measuring 45 ft from bumper to bumper, the SuperTwin truck features articulated body construction, hinged vertically, and the use of three axles with front and rear wheel inter-steering. It is powered by a 360-hp engine.*

### *Borg-Warner Readying Two Automatic Transmissions*

Two types of automatic transmissions will soon be offered to motor car manufacturers by the Borg-Warner Corp., with the prospect that they will be adopted toward the end of the year. This was revealed by C. S. Davis, Borg-Warner president, in the company's annual report which stated that 1948 was a peak year with net sales of $309,253,830 and net earnings of $29,714,993. Mr. Davis stated further that the company expects to spend $5 million in 1949 for the completion of a $40 million four-year expansion plan.

### *Chrysler & Independents Fight Automobile Freight Rates*

The Chrysler Corp., Hudson, Nash, Studebaker, Packard, and Willys-Overland are continuing the fight begun in 1939 for relief from what they term "discriminatory freight rates" on new automobiles. They charge that the railroads charge much higher freight rates on complete automobiles shipped from principal production cities than they do on cars shipped from outlying assembly plants throughout the country. They say further that this particular rate structure works in favor of Ford and GM because these companies ship relatively few finished cars from the principal plant cities, but that they do ship parts at low rates to assembly plants throughout the country and that completed cars shipped from these widely scattered assembly plants carry a much more favorable freight charge giving them a competitive advantage.

### *Ford Resumes Bus Output After 5-Month Shutdown*

The Ford Motor Co. is resuming production of motor coaches, which has been halted since last Nov. 1 by a strike at Wayne Works, Inc., Richmond, Ind., which supplies coach bodies. The labor dispute has been settled and the Wayne Works is now back in operation. During the shutdown period, design and engineering advancements have been made and the selling agency, Metropolitan Motors Coaches, Inc., has improved its administrative program. Ford has been an important factor in the bus industry since 1935, and from 1943 through 1946 accounted for between 26 and 41 per cent of the country's total bus production.

### *Automobile Companies Slash Prices*

The biggest news sweeping the automobile industry at the moment is the wave of price cuts touched off by GM in late February. Between Feb 25, when GM made reductions of $10 to $40 on passenger cars and up to $150 on trucks, and April 5, four other companies had announced price reductions. Willys reduced prices by $25 to $270 about the middle of March. A few days later, Kaiser-Frazer came through with the largest reduction thus far, ranging from $198 on the Frazer to $333 on the Kaiser Special. It is estimated that rebates to dealers on stocks and inventories totaled about $4.5 million

is K-F's case. At the same time the discount structure which had been scheduled for an increase of about six per cent was revised, and a $200 trading allowance in effect since Feb. 14 was discontinued. It is understood that the discount on the Kaiser Special will remain unchanged at 19.2 per cent, and that on other models it will be increased about four per cent, or two per cent less than had been previously planned.

Ford was the next producer to cut prices with reductions of $12 to $30 on Ford, $80 to $120 on Mercurys, a flat $100 on all Lincoln and Lincoln Cosmopolitan models, and $10 to $40 on certain truck models.

The Ford Motor Co. of Canada has announced price cuts ranging from $30 to $114 on Ford, Meteor, Mercury, and Monarch cars. In order to compensate for the drop in prices, Ford has disclosed that it has restored the 24 per cent mark-up to its dealers.

Nash joined the parade with reductions of $20 to $120.

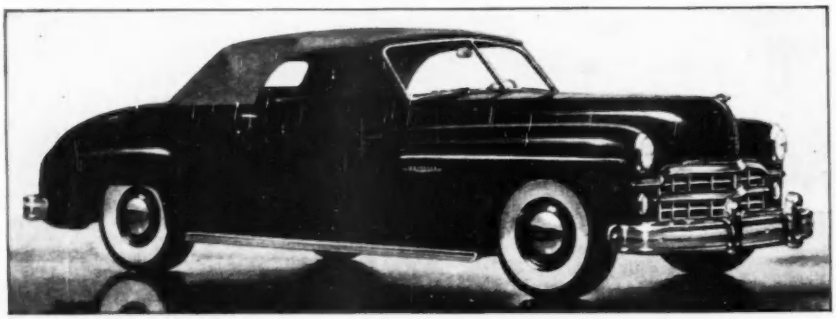
One of the biggest reasons why prices can be reduced at this time is the long awaited break in material prices. Lead, zinc and scrap prices have fallen during the past few months, and copper is definitely on the shaky side. In addition there have been reductions in the price of other materials used by the industry. Also some spokesmen for the automobile manufacturers say that they have been able to get fairly substantial reductions from suppliers. Steel prices have also weakened, and steel is probably the most important single material going into the production of automobiles. The reduction in zinc prices is important in view of the increasing number of die castings being used by the industry. The break in lead prices has already resulted in a substantial price cut on automobile storage batteries. With steel definitely getting easier to obtain, the gray market operator has practically disappeared, and the use of conversion steel is also on the wane. All of these factors will definitely contribute to lower costs and lower automobile prices. Another factor of importance in the picture is the improved quality that is showing up in products from vendors. Manufacturers are also cutting down on the number of long term commitments to suppliers.

### *Studebaker Completes Plant At Vernon, Calif.*

The Studebaker Corp., South Bend, Ind., recently completed a new assembly plant at Vernon, Calif.

### *Kaiser Interests Gain More Control at K-F*

Following a shakeup in the top command at the Kaiser-Frazer Corp., the Kaiser interests currently are firmly in control. Edgar F. Kaiser, former vice president and general manager, has been made president, succeeding Joseph W. Frazer who now is vice-chairman of the board. Henry J. Kaiser remains as board chairman. As president, Edgar Kaiser will be chief executive officer responsible for all departments. At the same time, O. B. Motter and W. A. MacDonald were removed as directors of the company, and their places on the board were left vacant. Currently, there are no plans to elect a new vice president to succeed Edgar Kaiser.



**SHORTER WAYFARER**

*This new 1949 Dodge Wayfarer three-passenger roadster, mounted on a 115-in. wheelbase, has an easily operated top and demountable side windows.*

### *Bricker Relinquishes Post as Ford Production Chief*

M. L. Bricker, Ford vice president and long a prominent member of the Ford production staff, has stepped down as head of the general production division. He will continue as a director, vice president, and member of the policy committee, and will act as a consultant on special projects and problems. Mr. Bricker started with Henry Ford in 1904, and except for a short period has been with the company continuously. He was superintendent of the Rouge plant during the 1920's when Ford was turning out more than 9000 cars a day.

### *Harnischfeger Makes New Lightweight Diesels*

The Harnischfeger Corp., Milwaukee, Wis., is said to be producing new lightweight Diesel engines for the marine, truck, and industrial markets. The company is currently making three-cyl and six-cyl models.

The reorganization is only one of several moves made in the past few weeks by K-F. While the coming year is undoubtedly going to see the first real test since the end of the war of how well the independents can fare against the Big Three, it will be particularly crucial for K-F since the company is the newest in the industry.

Apparently, management is shooting toward volume production of its lowest priced lines, the Kaiser Special and Kaiser Traveler, the latter a utility vehicle with the appearance of a four-door sedan. One advantage K-F has is that its expenditure for plant facilities actually was nominal since it purchased the entire Willow Run plant last year for $15 million on a long-term contract. However, there are other offsetting disadvantages, principally the high percentage of components the company buys. Also, it yet remains to be seen whether all the moves made to acquire iron and steel facilities will pay off in equal or lower material cost than would be possible by purchase in the open market.

# NEWS *of the* AUTOMOTIVE INDUSTRIES

**SHORTER FOR THREE**

*The first of Plymouth's new 111-in. wheelbase line to go into production, the new Plymouth three-passenger coupe, with an overall length of 185 5/16 in., shown above, is powered by a six-cyl, 97-hp engine with a compression ratio of 7 to 1.*

### Next Few Months Significant for Automobile Industry

While there is no lack of optimism among the automobile manufacturers, there is evidently an awareness that the next three months are going to be significant in pointing up the direction the industry will go this year. Three principal developments will be watched with considerable interest. One is the extent of the normal spring upsurge in new car sales. Business generally in other lines is in a stiff competitive battle, and a general feeling of hesitation everywhere is apparent. How this public attitude is reflected in the number of new car sales will have an important bearing on prices and production for the rest of the year. Another unknown factor at the moment is how far labor will go in demanding economic benefits either in the form of wage increases or social security measures, such as pensions, health and welfare funds, hospitalization and similar concessions. A third element to watch is Federal action on automobile credit. There is considerable agitation for further relaxation on installment buying to allow down payments of less than one-third and to extend payments to 24 to 30 months.

There is no doubt that the potential need and market for automobiles is huge, but the big question at the moment is whether the buying public will respond to lower list prices and better concessions by dealers enough to step up the expanded production planned for the next few months or whether they will become hesitant because of readjustments in the economy and back away from dealers' salesmen in droves. The manufacturers are banking on better salesmanship to move all the cars they build. If they are wrong, production schedules during the latter half of this year will be reduced. The next three months should tell the story.

### Start Work on Fisher Body's Pittsburgh Plant

With work on the building scheduled to start immediately, the contract for the construction of the new Fisher Body fabricating plant near Pittsburgh has been let to Ragnar-Benson, Inc., Chicago, according to J. J. Cronin, GM vice president and general manager of the Fisher Body Div.

### GM Names Dumville Director of New Devices Section

Harry C. Dumville has been named director of GM's new devices section succeeding John H. Hunt who is retiring after 36 years' service. Mr. Dumville was formerly assistant director.

Mr. Hunt joined Dayton Laboratories Co. in 1913 as a research engineer and remained with the company when it was absorbed by GM in 1918. He directed the electrical section of GM laboratories in Dayton in the early 1920's and came to the Detroit research laboratories in 1925. He was made head of the new devices section in 1932.

### Army Orders Replacement Engines From GM

GM's GMC Truck & Coach Div. of General Motors has been awarded an order totaling approximately $2.8 million for replacement truck engines for the Army. The engines are for replacement use in the wartime 2½ ton, 6 x 6 military truck. They are the 270-cu in power plant which was standard in these trucks during the war and are basically the same as GMC uses in its model 450 truck. Certain modifications are made, however, for use in military vehicles. The engines can be produced with current tooling at the GMC plant, and will be turned out by the end of this year.

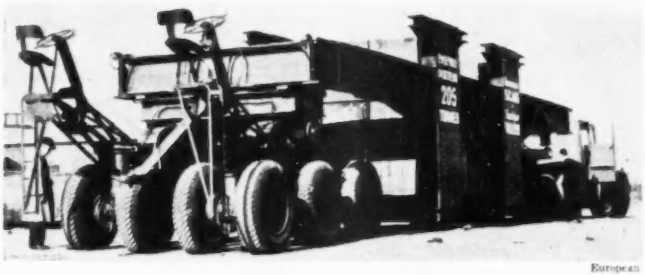
The Army has also announced contracts with the International Harvester Co. for 370 engines totaling $352,351; with Willys-Overland Motors, for 188 ¼-ton trucks, totaling $234,595; and

Acme

**INTERNATIONAL CHAMP**

*Built by the Belle-Clot Co. in Grenoble, France, this bus was selected over 163 other buses as the winner of the International Coach Building competition which was recently held in San Remo on the Italian Riviera.*

# NEWS *of the* AUTOMOTIVE INDUSTRIES



European

**COLOSSUS OF THE ROADS**

*Measuring about 121 ft in length, this truck-tractor, recently built by the Lancia de Bonneuil factory in France, is said to be the world's largest. The 32-wheel vehicle weighs 1205 tons, and can carry a load of 135 tons. Powered by an eight-cylinder 200-hp engine, it reportedly has a speed of about 9 mph.*

with the Zenith Carburetor Div. of the Bendix Aviation Corp. for 50,000 repair kits totaling $151,000.

### February Factory Vehicle Sales Set Postwar High

Setting a postwar high for the month, factory sales of motor vehicles in February, 1949, totaled 426,665 units, topping the same month in 1948 by 11 per cent, according to the Automobile Manufacturers Association.

### AC Spark Plug Awarded Third Military Order

GM's AC Spark Plug Div. has received a new order for aviation spark plugs from the U. S. Air Forces. The order which amounts to nearly $760,000 is the third military contract the division has received since last fall. It has a $23 million contract for bomb sights which will be built at a new plant in Milwaukee, and also has an additional bomb sight order amounting to $1.5 million.

### British Car Imports Sag As U. S. Market Softens

As had been expected, imports of British automobiles have started to weaken as the buyers' market has developed for automobiles in the United States. During January, imports of cars from Britain dropped sharply to 1845 units, compared with 2824 in December and an average of 2100 a month during 1948. It is generally agreed that when the automobile market tightens in this country, it will be increasingly difficult for the British and other foreign automobile manufacturers to compete. The British did very well during the postwar period up to now, but it is believed that their success was due to the car shortage in this country rather than to any pronounced change in the buyers' attitude which has been traditionally in favor of American cars. An added difficulty for the foreign manufacturer is a 10 per cent tariff charge, plus ocean freight charges which now amounts to about $130 on the smallest vehicle.

### Hispano Suiza of France to Make Hercules Engine

The Hercules Motors Corp., Canton, O., and Hispano Suiza of France have recently completed negotiations which licenses the French company to build two series of Hercules high-speed, heavy duty Diesel engines for application in commercial vehicles and industrial machinery in France.

### British Passenger Car Exports Down in January

Great Britain's growing difficulties in finding export markets for automobiles are reflected in the returns for the month of January when British passenger car production totaled 28,597 units, of which 18,401 was exported and 10,196 left for the home market. This represents 64.3 per cent exported, compared with a target of 75 per cent. The closing of foreign markets because of currency difficulties is stated to be responsible for the drop. The Standard Motor Co. laid off 1700 employes in March because of export difficulties.

**CALIFORNIA'S LATEST**

*Made by Del Mar Motors, Inc., San Diego, Calif., the new Del Mar, shown above, has a 100-in. wheelbase and is powered by a 63-hp Continental engine. Expected to sell for about $1170, fob, San Diego, the new car is said to have a speed of up to 80 mph.*

Standard assembles the Ferguson farm tractor, and Sir John Black, managing director, states that the difficulties are due very largely to restrictions in France and Argentina.

### Harry C. Moock Retires From Chrysler Staff

Harry C. Moock, active in the automobile industry for nearly 40 years, has retired as managing director of the Chrysler Conference of Business Management and vice president of the Plymouth Div., effective April 30. He

will, however, be available to the various Chrysler divisions for sales and training counsel and will continue his writing and lecturing activities. Mr. Moock joined the company in 1930, and the following year became general sales manager of Plymouth. He was made vice president of the division in 1934, and for the past nine years has been head of the Chrysler Conference of Business Management.

### SEC Clears Playboy Motor Stock Registration

The Securities & Exchange Commission has cleared registration of a new two million share stock issue by the Playboy Motor Car Corp., Buffalo, N. Y. This permits sale of Playboy stock in any state in which the sale is qualified. According to records filed with the SEC, Playboy expects to obtain net proceeds of about $3 million if all the stock is sold, and has made an arrangement with the Aetna Securities Corp. of New York to handle sale of the stock.

### Ford Names Miller as Head of Rouge Division

The Ford Motor Co. has appointed Logan C. Miller as general manager of the Rouge Div.

### Award 1948 Wright Medal to Van Every

The Wright Brothers Medal for 1948 was awarded to Kermit E. Van Every, chief of aerodynamics, Douglas Aircraft Co., Inc., El Segundo, Calif., on April 13 during the National Aeronautic and Air Transport Meeting of the SAE in New York City. He won the award for his paper "Aerodynamics of High Speed Airplanes" presented at the SAE Aeronautic Meeting last October in Los Angeles.

### Labor More Plentiful In Detroit Area

Detroit automobile manufacturers expect no labor shortage this year. According to the Michigan Unemployment Compensattion Commission, the labor surplus in the Detroit area has nearly tripled in the last three months and stands now at more than 90,000.

### Now Produce Eaton Axle Units In Canada

Through manufacturing arrangements between the Eaton Mfg. Cc. and the McKinnon Industries, Ltd., Eaton Two-Speed Axle units are now being made in St. Catharines, Ont., of Canadian materials and by Canadian labor. GM, International Harvester Co. and Ford Motor Co. will offer Eaton Two-Speed Axles fabricated in Canada on various model trucks.

### Regular Gasoline Standard for Govt. Motor Vehicles

The regular grade of gasoline is now the standard fuel for Uncle Sam's huge fleet of 165,000 motor vehicles. The Bureau of Federal Supply has ordered the restriction into effect, and while its decision has no force of law, it is nevertheless equal to an order since the agency acts as procurement office for a major share of all supplies purchased by the Federal Government. Some 165,000 military and civilian vehicles operating in the United States are affected by the decision. Bureau officials admit that there probably will be some exceptions to the new regular gasoline policy. They point out, for example, that fire trucks and certain vehicles used by the Federal Bureau of Investigation will continue to use high octane, or premium, gasoline.

### Keller Motors to Offer $5 Million Issue

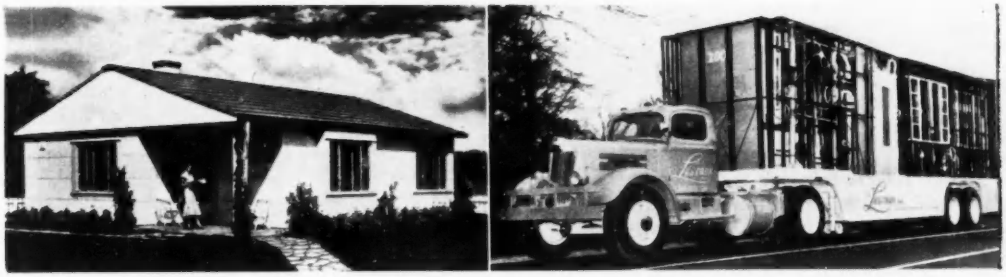
The Keller Motors Corp. is planning to offer five million shares of common stock to finance the volume production of the Keller car at Huntsville, Ala. It is proposed to raise about $5 million, less underwriting expenses, through the proposed sale of the stock.

### Douglas Developing Successor to Skyraider Bomber

The final design of a new experimental attack bomber as a possible successor to the AD Skyraider series has been progressing throughout the year at the Douglas Aircraft Co., Inc., according to the annual statement of the company to the stockholders.

### Rolls-Royce Buys GM Interest in Commonwealth Engine

GM's part interest in the Commonwealth Aircraft Corp., airplane engine manufacturer in Australia, has been bought by Rolls-Royce. Commonwealth has been licensed to produce Rolls-Royce Nene turbo-jet engines.



**ROLLING THE LUSTRON HOME**

*Built by the Lustron Corp., Columbus, O., the new, all-steel, porcelain-enamelled Lustron Home, at the left, is shown being delivered in one complete unit at the right by a White Motor Co. Super Power tractor with specially-built semi-trailer. Parts are loaded in the order of their use, and the trailer becomes a storehouse during the erection period. Fully loaded, the trailer weighs 46,000 lb, and it has 80 compartments, hauls 3300 parts and 4000 nuts and bolts.*

# NEWS *of the* AUTOMOTIVE INDUSTRIES

## NEW TRUCK REGISTRATIONS*

*Arranged by Make in Descending Order According to the January, 1949, Totals.*

| MAKE | January 1949 | January 1948 | Per Cent of Total 1949 | Per Cent of Total 1948 |
|---|---|---|---|---|
| Chevrolet | 21,871 | 23,121 | 32.93 | 33.27 |
| Ford | 11,990 | 7,573 | 18.05 | 10.90 |
| Dodge | 8,601 | 7,426 | 12.95 | 10.69 |
| International | 7,603 | 10,250 | 11.45 | 14.75 |
| G. M. C. | 4,845 | 5,640 | 7.29 | 8.12 |
| Studebaker | 4,434 | 3,990 | 6.68 | 5.74 |
| Willys-Truck | 2,150 | 1,166 | 3.24 | 1.68 |
| Willys-Jeep | 1,485 | 3,860 | 2.24 | 5.56 |
| White | 713 | 1,041 | 1.07 | 1.50 |
| Diamond-T | 524 | 806 | .79 | 1.16 |
| Mack | 514 | 1,071 | .77 | 1.54 |
| Reo | 370 | 1,143 | .56 | 1.64 |
| Divco | 280 | 574 | .42 | .83 |
| Autocar | 226 | 329 | .34 | .47 |
| Brockway | 164 | 362 | .25 | .52 |
| Federal | 119 | 413 | .18 | .59 |
| Crowley | 115 | 159 | .17 | .23 |
| F. W. D. | 33 | 107 | .05 | .15 |
| Kenworth | 30 | 39 | .04 | .06 |
| Sterling | 23 | 27 | .03 | .04 |
| Pontiac | 3 | | | |
| All Others | 330 | 387 | .50 | .56 |
| Totals | 66,423 | 69,486 | 100.00 | 100.00 |

* Data from R. L. Polk & Co.

### *Continental Names Engstrom Executive Vice President*

Thura A. Engstrom has been made executive vice president of Continental Motors Corp. He has been associated with the company since 1925, and was elected vice president and general manager of the Muskegon division in 1947. Recently he has been works manager for the aircraft, automotive, and industrial engine divisions. Continental has also announced that Frederick H. Faust has been elected secretary.

### *GM Stock Ownership Extends Over World*

The wide dispersal of ownership of GM stock is revealed in a study made at the end of 1948. It shows that stockholders reside in every state of the union, the District of Columbia, six U. S. possessions and 77 foreign countries. The total number of stockholders the first quarter of this year was nearly 435,000.

### *USAF Selects Fairchild T-31 as Future Basic Trainer*

Designated the T-31, a low-wing, all-metal, single-engine airplane made by the Fairchild Engine and Airplane Corp. has been selected by the U. S. Air Force as its future basic training plane. The T-31 is the USAF version of the Navy XNQ Fairchild training aircraft. Orders totaling over $8 million for 100 T-31's will be placed with Fairchild and component suppliers in the near future, and full-scale production will be reached in about 10 months. The T-31 will be basically the XNQ which has a wingspan of about 41 ft, is approximately 28 ft long, and 10 ft high. Its gross weight is 3750 lb.

### *Bell Has New Three-Passenger Helicopter*

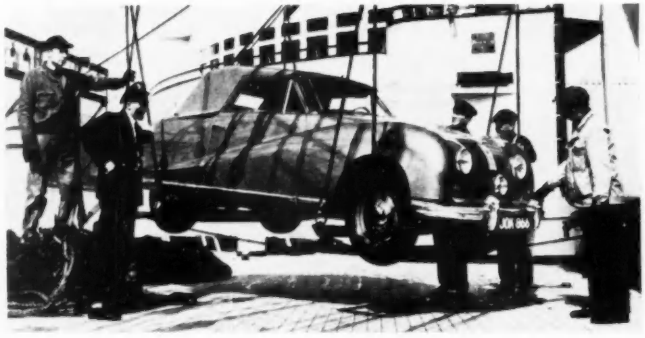
The Bell Aircraft Corp. has announced a new general purpose helicopter, designed to carry three passengers and a payload almost 40 per cent greater than previous models. It will be known as the Bell 47D1 and will sell domestically for $23,500, according to David G. Forman, manager of the firm's helicopter division. The price is a reduction over previous models, which have sold for $39,500 and $25,000. The 500-lb payload of the new Bell helicopter has been achieved by design improvements which have resulted in a reduction of the empty weight to 1360 lb, firm officials said.

### *United Aircraft Corp. Nets $9.4 Million in '48*

The United Aircraft Corp. has announced that in 1948 net income was $9,423,718 and sales totaled $207,956,522, as compared with net income of $9,816,295 on sales of $208,263,495 in 1947.

### *Von Karman Chairman of Aerojet Technical Board*

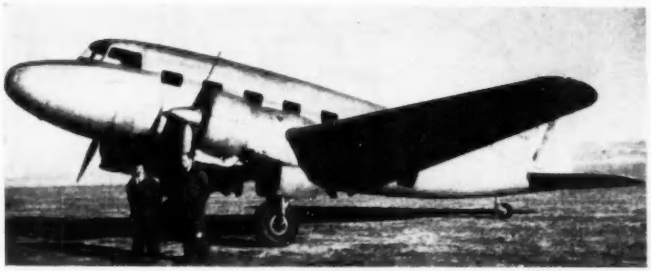
Dr. Theodore von Karman has assumed the chairmanship of Aerojet Engineering Corp.'s newly-created Technical Advisory Board which includes Dr. Fritz Zwicky, rocket expert and astrophysicist Dr. Clark Millikan, director of the Guggenheim Aeronautical Laboratory, California Institute of Technology; and Dr. Hsue-Shen Tsien, recently appointed Robert H. Goddard Professor of the Daniel and Florence Guggenheim Jet Propulsion Center, California Institute of Technology.



**BUNDLE FROM BRITAIN**

*Arriving in New York City, and marking the first time that an imported automobile has tried to break the stock car records in this country, this 90-hp Austin Atlantic convertible recently started a high-speed endurance run on the Indianapolis Motor Speedway. The American Automobile Association will strip the car and check it against specifications after the run.*

# NEWS *of the* AUTOMOTIVE INDUSTRIES



European

**SPAIN'S NEW PLANE**

*The first of a series of small two-engined planes to be built in Spain, the Alcotan, with a reported speed of approximately 211 mph, was test flown recently in Madrid. It can hold ten passengers and three crew members.*

### France to Produce 200,000 Tractors by 1952

France has an elaborate tractor production program under which, it is expected, 200,000 to 250,000 tractors will be built by 1952, making France independent of outside supplies except for a few special types. Production in 1947 was 8200, which rose to 20,500 last year. The estimate for 1949 is 29,000, but up to the present, production has been restricted principally because of the shortage of ball bearings and tires.

### Plymouth Names DeCavitte as Factory Manager

Frank L. DeCavitte has been appointed factory manager of the Detroit plant of Chrysler Corp.'s Plymouth Div. Formerly plant manager of the Evansville plant, Mr. DeCavitte has been succeeded by George H. Rumford, Jr., superintendent of the Evansville plant.

### Limit Midget Offenhauser Compression at 8 to 1

The American Racing Drivers' Club, Inc., has reportedly limited the compression ratio of the Offenhauser midget racing engine to 8 to 1.

### Stanley Aviation Now Has $100,000 Backlog

The Stanley Aviation Corp., Buffalo, N. Y., headed by Robert M. Stanley, a former chief test pilot and vice president at Bell Aircraft and reportedly the first man in the U. S. to fly a jet-propelled airplane, has a current order backlog of over $100,000: 60 per cent from the USAF and 40 per cent from the Navy. Stanley's work for the Navy is in the field of guided missile devices, and for the Air Force, it is producing electronic photographic timers, photo-processing devices, parts for radio-controlled target planes and instrument training devices.

### Canadian Austin to Establish New Storage Warehouse

The Austin Motor Co. (Canada) Ltd., will establish a storage warehouse for vehicles and parts at the main building of its plant, in Hamilton, Ont., Canada, H. D. Fearman, development manager, has announced. Stockpiling of parts in Canada will insure adequate replacements for the company's Canadian dealers. Mr. Fearman stated that the actual manufacture of Austin products in Hamilton had been postponed indefinitely; however, the building will be retained and the grounds landscaped this summer.

### Texas Engineering to Build Boeing B-54 Components

The Texas Engineering and Mfg. Co. will build components for the Boeing Aircraft Co.'s B-54. Texas Engineering has received an initial order for 43 major units of the B-54.

### Austrian Company to Assemble Fiat Automobiles

The Fiat Co., Turin, Italy, has agreed to supply the Steyr-Daimler-Puch Co. of Austria, with the various parts of the Fiat 1100 car which the Austrian company will assemble. The agreement covers 2000 cars during 1949, and the deliveries are to be made against Austrian imports of materials and goods necessary to Italy.

### Lawrence Institute Gets Packard Aircraft Unit

The Lawrence Institute of Technology in Detroit has acquired the aircraft test building adjoining the Packard plant from WAA. The facilities had been offered to private industry, but there were no takers. The one-story building was used by Packard for testing Rolls-Royce engines during the war.

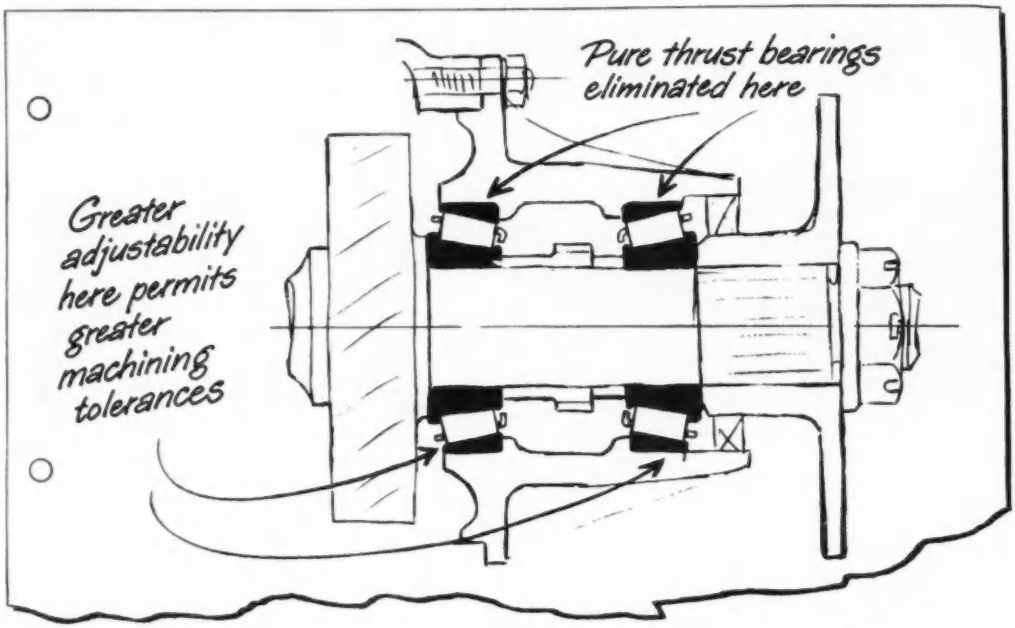
(*Turn to page* 44, *please*)

**NEW PASSENGER CAR REGISTRATIONS***

*Arranged by Makes in Descending Order According to the January, 1949 Totals*

| MAKE | January 1949 | January 1948 | Per Cent of Total 1949 | Per Cent of Total 1948 |
|---|---|---|---|---|
| Ford | 55,191 | 44,896 | 20.20 | 16.33 |
| Plymouth | 35,485 | 30,311 | 12.99 | 11.02 |
| Chevrolet | 30,172 | 55,090 | 11.04 | 20.03 |
| Buick | 25,837 | 18,073 | 9.46 | 6.57 |
| Dodge | 19,881 | 20,335 | 7.28 | 7.40 |
| Oldsmobile | 13,896 | 12,148 | 5.08 | 4.42 |
| Pontiac | 12,719 | 16,428 | 4.66 | 5.97 |
| Hudson | 11,137 | 6,595 | 4.08 | 2.40 |
| Mercury | 9,271 | 10,110 | 3.39 | 3.68 |
| Studebaker | 9,232 | 10,211 | 3.38 | 3.71 |
| Chrysler | 9,092 | 8,621 | 3.33 | 3.14 |
| Nash | 7,937 | 8,469 | 2.91 | 3.08 |
| De Soto | 7,675 | 6,946 | 2.81 | 2.53 |
| Cadillac | 6,308 | 4,351 | 2.31 | 1.58 |
| Packard | 6,122 | 4,152 | 2.24 | 1.51 |
| Lincoln | 3,607 | 1,726 | 1.32 | .63 |
| Kaiser | 3,354 | 7,410 | 1.23 | 2.69 |
| Frazer | 2,143 | 5,443 | .78 | 1.98 |
| Willys | 1,776 | 1,886 | .65 | .69 |
| Crosley | 1,066 | 1,449 | .39 | .53 |
| British Ford | 555 | | .20 | |
| Austin | 212 | 239 | .08 | .09 |
| All Others | 493 | 87 | .18 | .02 |
| TOTAL | 273,169 | 274,978 | 100.00 | 100.00 |

* Data from R. L. Polk & Co.




# How simple can your secret transmission be?

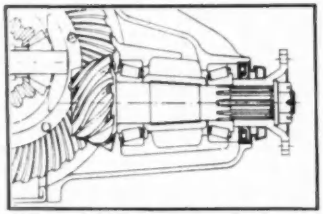
IF you're looking for greater simplicity in the new transmission you're developing, don't button up your plans until you consider Timken bearings.

With Timken bearings on the shafts of your secret transmission, you get increased simplicity these three ways:

Because Timken bearings carry both radial and thrust loads, special thrust bearings and thrust washers can be eliminated, resulting in greater economy of design. Timken bearings can be easily adjusted when shafts are installed in the transmission housing, making possible a more simplified mounting. And since Timken bearings can be taken up during assembly, machining tolerances in surrounding parts can be greater.

The result is a more simplified design, more simplified production, and a better-working transmission, too!

Timken bearings carry any combination of radial and thrust loads, eliminating deflection and end-movement. Shafts are held in rigid alignment—clearances between revolving parts can be closer without danger of interference. Longer transmission life is assured because friction and wear are negligible. Whatever type of transmission your secret transmission may be, Timken roller bearings can make it better.



*All but two cars use Timken bearings on the pinion. Here's a typical application.*

**THE TREND'S TO TIMKEN FOR THE TOUGHEST JOB OF ALL!** (See diagram, left) During the past year, two more car manufacturers have switched to Timken bearings on the pinion. So now, all but 2 cars depend on Timken bearings for the automotive industry's toughest bearing job.

For the latest technical bearing data, which may help you design Timken bearings into your newest transmission plans, call upon our engineering staff. In Detroit, phone TRinity 5-1380. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

**NOTE TO P. A.'S.** *Because every step of the manufacture of Timken bearings is controlled within our company . . . because our vast manufacturing facilities are widely dispersed . . . you will find the Timken Company a supply source of outstanding reliability.*

**TIMKEN**

TRADE-MARK REG. U. S. PAT. OFF.

**TAPERED ROLLER BEARINGS**

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◐ AND THRUST →◐← LOADS OR ANY COMBINATION ✳

*By Eugene F. Gonda*

# 77 Makes of Cars from 8 Nations at the Geneva International Salon

Special to AUTOMOTIVE INDUSTRIES,

Geneva, Switzerland

SEVENTY-SEVEN different makes of passenger cars were on display at the 19th International Automobile Salon which was inaugurated in Geneva March 17 by President Ernest Nobs of Switzerland. The salon was founded 25 years ago. This year five more makes of cars were on exhibition than were displayed a year ago. In addition, this year 54 makes of industrial vehicles were on display as against 44 last year and 23 types of bodies as against 15 in 1948.

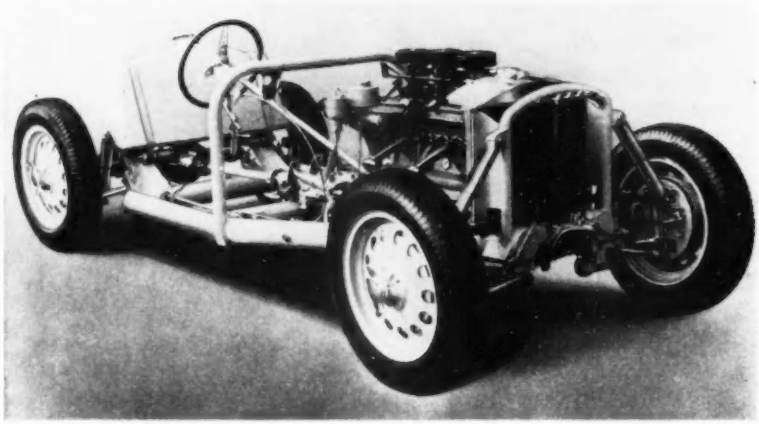
A total of 120 accessory and equipment firms was represented as well as nine motorboat manufacturers. One hundred sixteen makes of cycles and motorcycles were displayed and there was also an impressive display of various makes of tires, fuels and lubricants.

Passenger cars were divided among the different nations as follows: Britain—23; United States—22; France—14; Italy—9; Czechoslovakia—3; Germany—4; Holland—1; Austria—1.

Among the British cars represented were such famous makes as Alvis, Armstrong Siddeley, Austin, Bentley, Daimler, Frazer-Nash, Hillman, Humber, Jaguar, Lagonda, Rolls Royce, Singer, Standard, Sunbeam, Vauxhall, and others.

The United States displayed Buick, Cadillac, Chevrolet, Chrysler, Crosley, De Soto, Dodge, Ford, Frazer, Hudson, Kaiser, Mercury, Nash, Oldsmobile, Packard,

*Here is the new Simca 8 Sport model. It has a four-cylinder, valve-in-head engine and is said to attain a speed of nearly 70 mph.*



*Frazer-Nash competition chassis. The frame is steel tubing and its weight is only 1120 lb.*

## Geneva International Salon

Playboy, Plymouth, Pontiac, Studebaker, Willys, Davis and Keller.

France—Boitel, Citroen, Claveau, Delage, Delahaye, Ford-France, Hotchkiss, Julien, Panhard, Peugeot, Renault, Rovin, Salmson, Simca and Talbot.

Italy—Alfa-Romeo, C.E.M.S.A.-Caproni, Cisitalia, Ferrari, Fiat, Isotta Fraschini, Lancia, Moretti and O.P.E.S. Maserati.

Czechoslovakia—Minor, Skoda and Tatra.

Germany—Alta, BMW, Opel and Volkswagen.

Holland—Gatso.

Austria—Porsche.

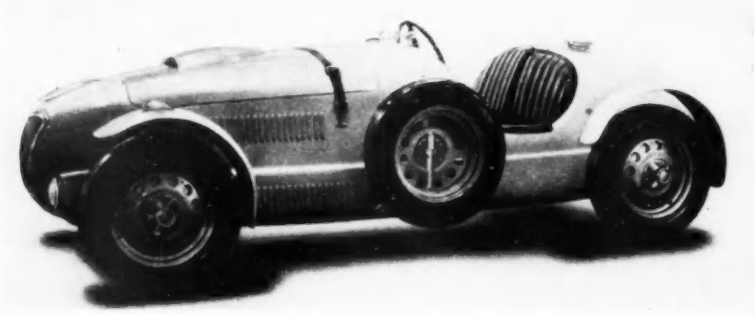
In general, it may be said that in virtually all makes there is an improvement in engine performance as a result of increases in compression ratios. However, for the present at least, these increases are limited by the difficulty in finding gasoline of sufficient octane rating to meet the needs of high-compression engines. The trend is to lower the center of gravity of the new cars without reducing the comfort of passengers.

Standardization of gear shifts and automatic clutches also was noted, as well as a trend toward reduction of weight without affecting the rigidity or riding qualities of the cars. This latter is an important matter especially for cars driven on European roads, which in general are inferior to the highways in the United States. This result has not been compromised by the increased general use of light, high-strength metals.

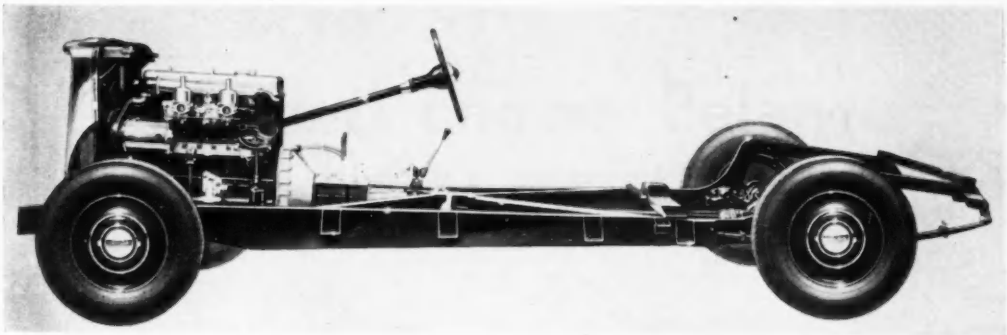
Seats have been rearranged from the point of view of comfort and riding quality, and visibility has been increased. In numerous closed cars of the sedan type the separate chassis frame has been abolished. In general the quality of 1949 cars is clearly superior to that of 1948 models.

A year ago European experts complained that American cars, which looked beautiful and were constructed for American highways, held the road badly on the twisting, turning and often tortuous European highways, above all in the mountainous regions such as are found in Switzerland. This year these criticisms have turned to praise, for the American cars, in the unanimous opinion of experts here, have better suspension and springing systems and more effective shock-absorbers. Favorable comment also has been won by the tendency to smaller engines in some American cars, leaving more room for passengers, and by the notable progress in clutches and in automatic and semi-automatic transmissions.

New grouping of instrument panel controls and in-



*Frazer-Nash competition model with an aluminum alloy body.*



*Jaguar Mark V chassis.*

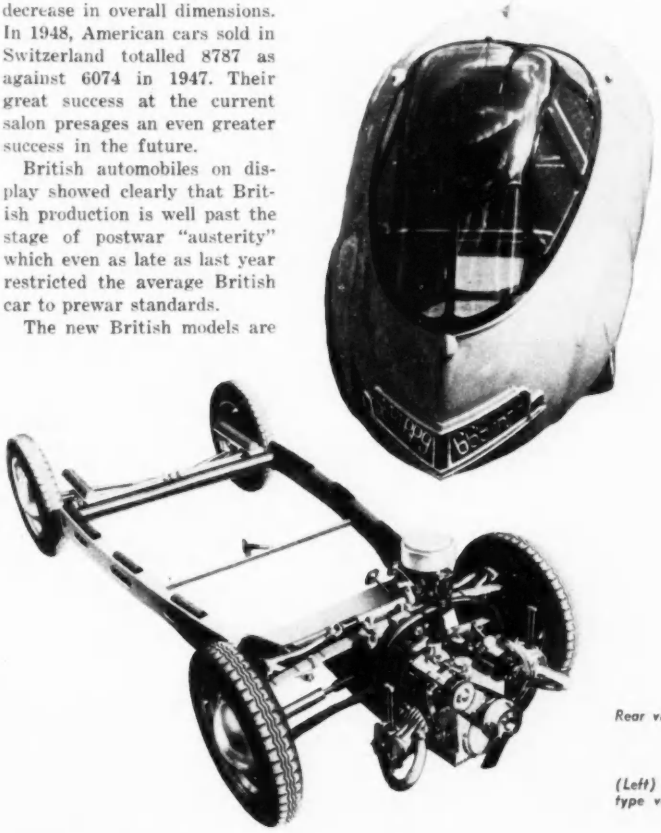
struments in front of the driver as well as other innovations in the American cars were widely praised as making the task of the driver easier. Finally, the appearance of the American cars caused a sensation —especially the variations of rich colors and color combinations. The Chrysler group—Chrysler, De Soto, Dodge and Plymouth—made a distinct hit with their new body lines and their more spacious interiors despite their decrease in overall dimensions. In 1948, American cars sold in Switzerland totalled 8787 as against 6074 in 1947. Their great success at the current salon presages an even greater success in the future.

British automobiles on display showed clearly that British production is well past the stage of postwar "austerity" which even as late as last year restricted the average British car to prewar standards.

The new British models are really modern cars and conform to the up-to-date demands of automobilists. They hold the road better than previous models and at the same time retain the comfort that always has been characteristic of British automobiles. In addition, British manufacturers for the first time are drastically departing from their classic body styles and are shifting to the streamlined forms created in the United States and now more and more favored elsewhere in Europe. This is especially notable in the case of the Austin A40, the Austin A90, the four-cylinder Hillman Minx, the Morris Oxford and the Lea-Francis Mark V. The celebrated Rootes Group of London has come out with some real masterpieces—the new models of the Sunbeam, Humber and Hillman.

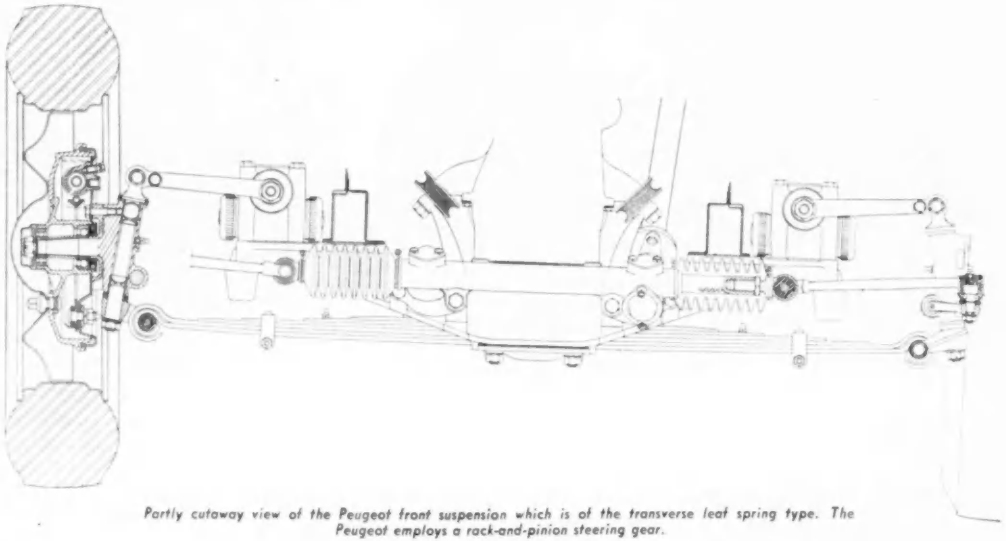
The new 2-liter Sunbeam, an aristocrat of sport cars, has a valve-in-head engine capable of high acceleration. The car with its extremely low chassis holds the road exceptionally well. It has a synchromatic transmission with four forward speeds. The gear shift lever is under the steering wheel. The brakes are claimed to be among the most effective yet devised. The Sunbeam can roll along at about 90 mph.

The Humber has a modern chassis, a synchromatic transmission and a very quiet engine. The



*Rear view of the Panhard Dynavia which is said to have a top speed of 90 mph.*

*(Left) Panhard Dynavia chassis. Note the torsion bar type valve springs which extend upward from the heads of its aircooled engine.*



*Partly cutaway view of the Peugeot front suspension which is of the transverse leaf spring type. The Peugeot employs a rack-and-pinion steering gear.*

## Geneva International Salon

lines of this car were inspired by the work of the master body-makers of Italy and France, but the makers claim for it "American comfort" and an "irreproachable British finish."

The little Hillman with a 35 hp engine and 93 in. wheelbase also has four speeds forward and a synchromatic transmission. It is a low-slung car with exceptionally large and comfortable seats for its size. It recently won first prize for comfort in Class II at the Rallye de Monte Carlo. Its little engine is capable of rapid acceleration and a relatively high average touring speed without excessive vibration and with very economical gasoline consumption.

France, while maintaining its traditional production of well-known cars such as the Citroen, the Hotchkiss, Talbot, etc., seems now to have succeeded in solving the problem of manufacturing small cars having many advantages of the larger ones. The 19-hp, 83-in. wheelbase Renault was regarded by spectators at the salon as a truly marvelous little car. It has plenty of room for four persons and yet weighs hardly more than 1200 lb. It can travel at a maximum speed of about 58 mph and uses very little fuel. Its price was lower than that of any other four-passenger car shown at the salon. As is well known by now, its four-cylinder valve-in-head engine is located at the rear of the car.

Its direct competitor is the "Dyna" Panhard, also a four-passenger car of about the same dimensions and weight and capable of better than 60 mph. At the Panhard stand there was another handsome car—a small but very modern looking job built for high speed. It is called the "Dynavia" Panhard. With its aerodynamic form, it is capable of about 90 mph, but its consumption of gas remains low. Its brakes, suspension and road-holding qualities are pronounced excellent. The car is built somewhat in the shape of a tear-drop. The Dyna and Dynavia each have a two-cylinder, valve-in-head aircooled engine with mechanical and fuel injection and pressure lubrication. The body is constructed of light metal.

The famous French Peugeot firm has abandoned its former models and has come out with the "203," a beautiful little car with an aerodynamic appearance and capable of a cruising speed of about 53 mph. Its top speed is considerably higher. It has a four-cylinder, 78.7 cu in. engine of the valve-in-head type, and a four-speed transmission. Fourth speed is overdrive. The car has independent front-wheel suspension and double-acting hydraulic shock absorbers. It is equipped with Lockheed hydraulic brakes. Body work is de luxe and the car is equipped with a so-called "sunshine" or openable roof.

Among the new Simcas, a new 8-sport model attracted particular attention because of its harmonious lines and the ruggedness of its engine, a four-cylinder valve-in-head job of 66.5 cu in. piston displacement. It has four speeds, hydraulic brakes, and can attain a speed of nearly 70 mph.

Italian cars, which drew a lot of attention last year because of the beauty of the models, enjoyed great success again this year. Conditions in Italy do not permit mass production, and for this reason the producers therefore are freely following their individual tastes with respect to the lines and luxurious appointments of their cars, particularly the body work.

(*Turn to page* 82, *please*)

# Improved Engine Balancer

A NEW model of the General Motors Research Laboratories' engine assembly balancer is now in production line duty at the Buick Motor Division. It is a modification of the first balancer for complete engines that Buick adopted 10 years ago (AUTOMOTIVE INDUSTRIES, Nov. 15, 1939).

The same three basic units of the original model—a bed and cradle assembly for mounting the assembled engine, a pair of vibration indicators and an electric drill for removing overall unbalance at the flywheel—are essentially the same in the new version.

The main modifications are designed not only for greater ease in operation but also to make the machine more flexible. It now can handle the entire Buick engine series with Synchro-mesh or Dynaflow transmissions. Earlier models were limited to a single series of engines, but they have since been altered for universal operations at the Buick plant.

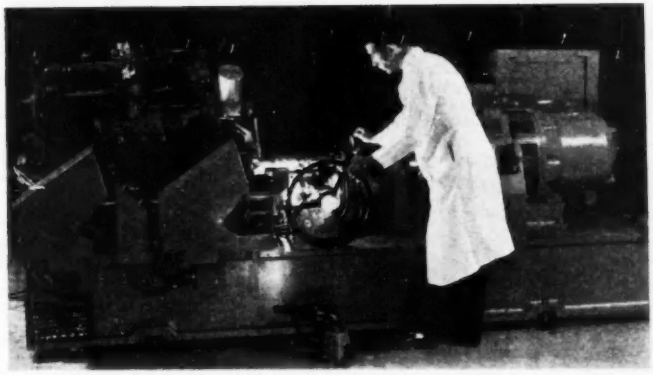
The balancer enters the engine production cycle after all rotating parts except the flywheel have been individually balanced to specified limits, and pistons and connecting rods have been weighed to close tolerances. Thus, overall unbalance can be corrected by drilling holes near the rim of the flywheel. This corrects any "stacking" in a single direction of indivdually balanced parts or any other off-center condition that may develop in the assembly.

The GM Research machine balances the complete engine assembly directly under compression, just as it would operate in a finished automobile. As the engine is placed in the cradle, which is suspended on metal reeds to pick up minute vibration, airlocks fit it firmly into place.

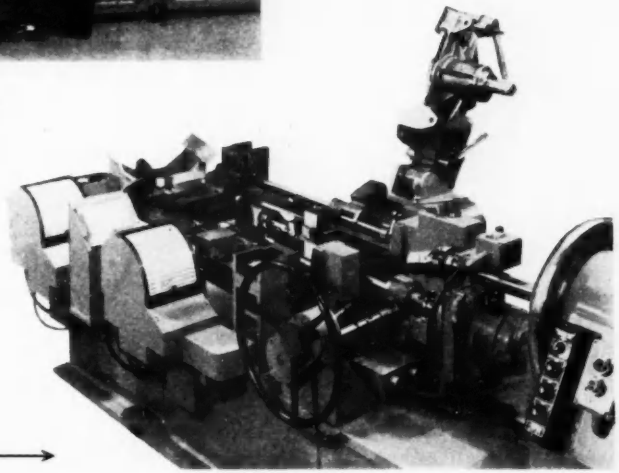
The engine reaches the balancer while still warm from the run-in at the test block stand. During the balancing operation hot oil is pumped through the crankcase into an overflow hose to the plant oil recirculating system. This lubricates the engine parts in the balancing cycle and completes the flushing phase of the engine test operation.

On the new model the two sensitive light ray indicator sine wave screens have been enlarged from four to eight inches for ease of operation. Mounted between them is an indicator which

(*Turn to page 94, please*)



*In this front view of the engine assembly balancer the operator is holding in his left hand the drill control wheel, while his right hand is on the "inching" button that moves the indexing wheel to the angle of unbalance in the engine flywheel. At the rear of the engine is the Dynaflow adapter counterweight, with the adapter in operation.*



*Speed and sine wave indicators are shown at the left of this illustration of the balancer. The drill control wheel is to the right of the indicators and the indexing wheel is at the extreme right. The Dynaflow adapter is shown out of operating position.*

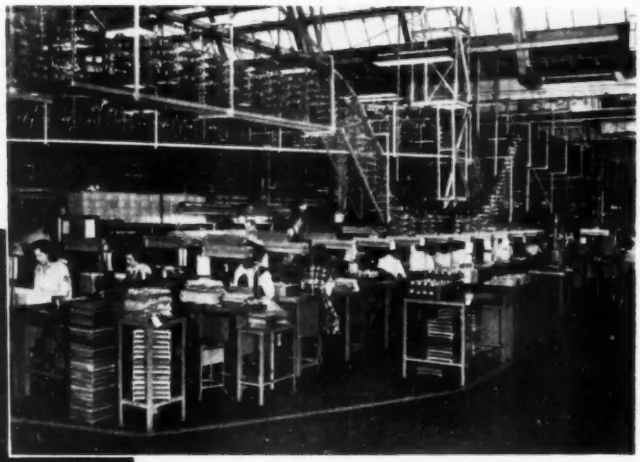
# A Complete

It isn't often that a complete metamorphosis takes place in the function of a large plant. Yet the Rochester Products Div., General Motors Corp., Rochester, N. Y., effected a radical change in plant equipment and engineering philosophy despite its pre-war specialization in instruments and electrical equipment and shock absorbers, and its wartime task of producing starting and lighting equipment for the Armed Forces. The company has become one of the leading producers of small-diameter steel tubing—in the world—turning out well over 100 miles of steel tubing a day. It has set a goal of 200 miles (over a million feet) of tubing a day for the near future. RPD tubing is made in small sizes—⅛ to ⅝—in. in diameter — for gasoline and oil lines, brake lines, windshield wipers, special requirements and for power mechanism operation in convertible cars.

Latest development stemming from this specialty is the large volume production of a telescoping radio antenna of stainless steel tubing for one of the GM division cars.

Along with tubing, RPD is being groomed as an important carburetor supplier. To this end they have organized a carburetor engineering staff which is housed in a newly-constructed engineering building, said to have the latest type of equipment for carburetor research, including a cold room for dynamometer testing under sub-zero atmospheric conditions.

Fruition of this activity is the new type of carburetor now being supplied for the 1949 Olds V-8



*Below:*
*Among the many automatic and hand operated fixtures for bending tubing to suit the requirements of various customers, is this example. An impression of the length and configuration of the unit may be gained from the stock in the foreground ready for delivery to the shipping department.*

*Above:*
*Lock and key assembly line in perspective with the feeder monorail conveyor which may be seen dipping to the line in the background to the right. Conveyor trays and cups contain locks in sets of ten, assembled around the keys in tailor-made fashion. An intricate system of bookkeeping follows assembly to that ignition locks, trunk locks, and door locks are matched for each car with a minimum number of cars having the same serial number for the same geographical area.*

*Right:*
*This is a view at the end of the tubing lines at RPD showing the reels for coiling tubing as it comes off the line in straight lengths. The coils then are taken off the reels and hung on the feeder and storage conveyor for transport to the fabrication departments.*

# Change-Over

## from Electrical Equipment to Carburetors and Tubing

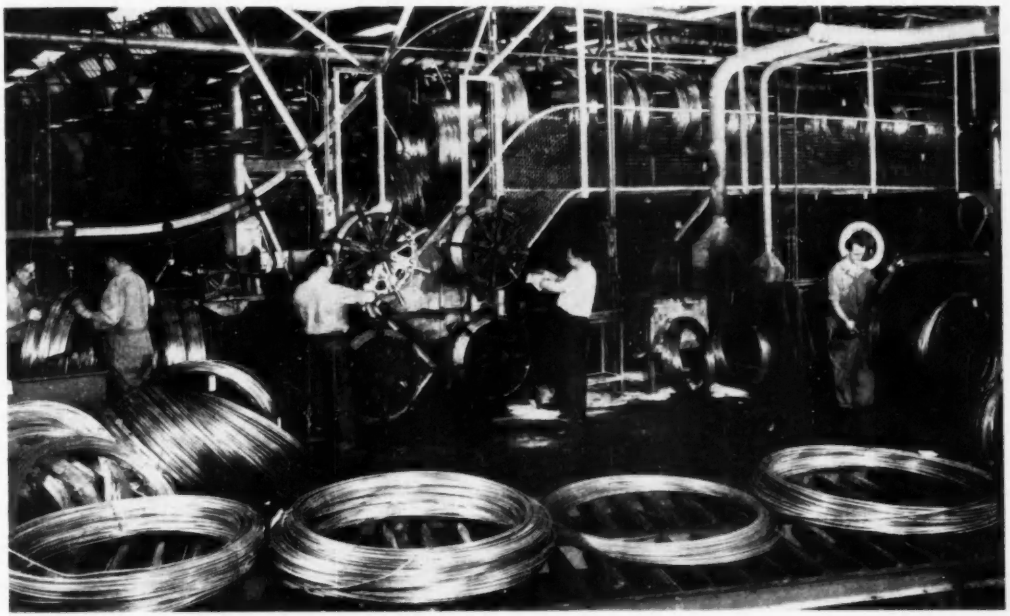
*Rochester Products Division of General Motors Now One of Leading Producers of Small-Diameter Steel Tubing and Being Equipped to Build New Type Carburetor in Big Volume*

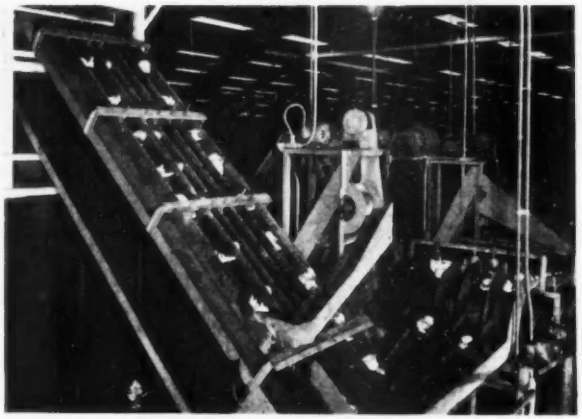
By Joseph Geschelin

engine, described in AUTOMOTIVE INDUSTRIES, Dec. 15, 1948.

To implement carburetor manufacture RPD has installed an extensive die casting department replete with die casting equipment of latest type, in addition to groups of multiple head machine tools of the most efficient design. Since die casting in the modern manner minimizes machining, the manufacturing facilities in the main emphasize tubing mills and annealing furnaces, and an extensive system of conveyors of many types. As illustrated here, conveyors are employed for assembly benches, for the transportation of parts and assemblies, and a unique multiple-belt conveyor arrangement for handling die castings from their origin in the die casting department.

Tubing is of two types—for low pressure applications such as gasoline and oil lines; and high pressure tubing for brake lines. Low pressure tubing is made





*Taken at the elevated level of the junction of the belt conveyors, this shows two of the die casting distribution lines described in the text. Distribution channels for different die castings may be seen. Directly in the center is one of the guides for returning die castings from one of the presses in the center background.*

in the familiar tubing mills to which is fed steel strip ranging from 0.011 to 0.042 in. in gage depending upon the size and type of tubing. As the strip is formed into true circular form, the seam is electrically welded at the end station of the tubing mill.

Emerging from the tubing mill, the continuous tube moves through an annealing furnace, then to an acid bath preparatory to a dip in a bath of molten tin and lead to form a protective coating. The annealing process, which requires an extensive stretch of furnaces for each line, is essential not only to relieve the stresses incidental to the tubing process but also to facilitate the coiling of tubing into large coils for handling in process through the plant.

An interesting side light of the operation is that strip steel is purchased in coils of certain standard widths, then slitted to the specific width required for each lot, using special slitting machines installed for this purpose. This reduces the variety of incoming raw materials and aids materially in economizing storage space and handling.

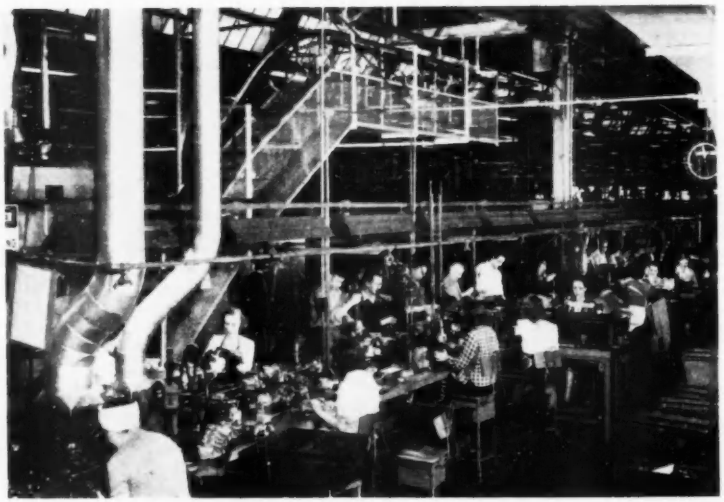
High pressure tubing is double-walled and is produced with a unique arrangement of patented roll design. The tooling is so designed as to take two strips at a time, forming them initially in separate rolls which gradually gather both tubing sections into a single tube near the end of the mill. The end of this mill is fitted with a swaging attaching designed to reform the tube into a perfectly circular form.

Instead of being welded, the high pressure tubing is copper-brazed while passing through a long furnace. In the initial zones of the furnace the tubing is brought up to brazing temperature, then it passes through a final zone where copper wire is fed into the furnace from overhead, reaching the tubing in the heated zone. After brazing the tubing continues through a molten tin and lead bath for the outer protective coating. Finally it is tested for leaks with an oil solution at 5000 psi.

An interesting example of automatic mechanical handling of parts from start to finish is found in the mechanization of moving zinc alloy die castings along the press lines. The illustration shown here is a view taken at a junction of the continuous belt conveyor lines where the movement of parts is changed in direction by 90 deg.

In operation, starting in the die casting department (which is out of the view shown here) castings while still hot are distributed to trim presses near the die casting machines, by the operators, primarily for

(*Turn to page* 96, *please*)



*Perspective view of the assembly for the new carburetor being produced by RPD for the Oldsmobile Rocket engine.*

# Farm Machinery Market To Continue Strong

## *Commerce Department Expects Export Demand to Offset Any Drop in Domestic Requirements*

**By Karl Rannells,**
Washington Bureau,
AUTOMOTIVE INDUSTRIES

FARM machinery output this year is expected to follow about the same pattern now predicted for most steel-consuming industries, according to a comprehensive study by the Department of Commerce. Briefly, according to the Commerce survey, a general balancing of supply with demand may be expected by the end of 1949, depending primarily upon the supply of steel.

Again as forecast for other steel-consuming industries, there is no indication of falling off of business or serious cutbacks in overall manufacture. Production is currently running at about three times the prewar level and the industry shipped out about $2 billion worth of farm machinery during 1948. This level is expected to be maintained throughout this year.

If the steel is available from mills and other regular sources, manufacturers expect to beat about 1,800,000 tons into plowshares and other farm goods. Now that steel demand is easing, makers of farm machinery and equipment are making it plain that they want no more dealings for conversion and gray market steel. They have had enough of that. Many in the industry, especially the smaller and newer firms, have had to buy such steel in the past in order to keep going or to fill the most pressing orders. It is reliably estimated that at least a sixth—or more than 300,000 tons—of the industry's total steel consumption last year was purchased from such sources.

Still in short supply are such items as tractors, tractor accessories such as gang plows and cultivators, combines and harvesters, picking machines and so on. This offers a prop to the market. While the domestic market for many items will continue to decrease this year, the Office of Domestic Commerce forecasts a strong, continued export market. Last year, foreign business amounted to $365 million or about 15 per cent of total production.

Paradoxically, the United States has been exporting farm machinery on one hand and importing on the other—imports during 1948 more than doubling those of 1947. Some $81 million worth were brought in last year. However, this was something of a horse-trading arrangement. A large proportion of the imports was tractors from the United Kingdom and combines and harvesters from Canada, both of which are in short supply in this country. Tractor imports from Britain are expected to be reduced before the end of this year.

(*Turn to page* 68, *please*)

### Shipments of Tractors, by Type: 1948 and 1947

| Type of Tractor | Shipments of Complete Units: Number | | Shipments of Complete Units: Value (Thousands of Dollars) | | Shipments of Attachments and Parts: Value (Thousands of Dollars) | |
|---|---|---|---|---|---|---|
| | 1948 | 1947* | 1948 | 1947* | 1948 | 1947* |
| TOTAL | 736,057 | 638,451 | 687,868 | 516,815 | 273,861 | 227,457 |
| Domestic | 622,784 | 539,312 | 547,801 | 410,026 | 225,426 | 181,504 |
| Farm use | 575,718 | 501,615 | 427,240 | 316,302 | 145,690 | 119,201 |
| Non-farm use | 47,066 | 37,697 | 120,561 | 93,724 | 79,736 | 62,303 |
| Export | 113,273 | 99,139 | 140,067 | 106,789 | 48,435 | 45,953 |
| Farm use | 102,652 | 89,348 | 104,115 | 75,909 | 26,675 | 24,947 |
| Non-farm use | 10,621 | 9,791 | 35,952 | 30,880 | 21,760 | 21,006 |
| Wheel type, total | 529,213 | 428,865 | 496,429 | 349,334 | 154,715 | 125,751 |
| Domestic | 436,505 | 352,443 | 398,933 | 280,867 | 130,832 | 104,241 |
| Farm use | 419,222 | 339,280 | 372,556 | 265,550 | 119,440 | 97,249 |
| Non-farm use | 17,283 | 13,163 | 26,395 | 15,317 | 11,392 | 6,992 |
| Export | 92,708 | 76,222 | 97,476 | 68,467 | 23,883 | 21,510 |
| Farm use | 91,099 | 74,503 | 94,297 | 66,103 | 22,206 | 20,337 |
| Non-farm use | 1,609 | 1,719 | 3,179 | 2,364 | 1,677 | 1,173 |
| Tracklaying type, total | 39,433 | 37,534 | 161,928 | 134,330 | 108,224 | 90,926 |
| Domestic | 29,424 | 27,685 | 121,303 | 99,164 | 82,382 | 67,456 |
| Farm use | 11,150 | 9,005 | 28,634 | 21,481 | 14,962 | 12,510 |
| Non-farm use | 18,274 | 18,680 | 92,669 | 77,683 | 67,420 | 54,946 |
| Export | 10,009 | 9,649 | 40,625 | 35,166 | 23,842 | 23,470 |
| Farm use | 3,003 | 2,625 | 8,064 | 6,851 | 3,888 | 3,771 |
| Non-farm use | 7,006 | 7,024 | 32,541 | 28,315 | 19,954 | 19,699 |
| Garden type, total | 167,411 | 172,252 | 29,511 | 33,151 | 12,922 | 10,780 |
| Domestic | 156,855 | 158,984 | 27,545 | 29,995 | 12,212 | 9,807 |
| Farm use | 145,346 | 153,330 | 26,048 | 29,271 | 11,286 | 9,442 |
| Non-farm use | 11,509 | 5,654 | 1,497 | 724 | 924 | 365 |
| Export | 10,556 | 13,268 | 1,966 | 3,156 | 710 | 973 |
| Farm use | 8,550 | 12,220 | 1,734 | 2,965 | 581 | 839 |
| Non-farm use | 2,006 | 1,048 | 232 | 201 | 129 | 134 |

* Revised.

Source: Bureau of Census, Department of Commerce.

# Automatic Transmissions

**This Article, the First of a Series on Modern Automatic Transmissions, Traces This Engineering Development from the Sturtevant Unit in 1904 to the Present Time. It Will Be Followed by a Description of the New Packard Automatic Transmission in the May 1 issue and by Analyses of Current Automatic Transmissions in Early Issues of AUTOMOTIVE INDUSTRIES.**

AFTER nearly half a century of effort on the part of inventors and engineers the automatic transmission finally has become established in the passenger car field. One such transmission, now regular equipment, was made available in 1940 and since then two others have become regular equipment. In these transmissions the gear changes or changes in torque ratio are influenced by the speed of the vehicle.

The first attempt to make an automobile transmission function automatically dates back so far that few of the present generation have any knowledge of it. It was made by the Sturtevant brothers of Boston, Mass., in 1904, the transmission (see Fig. 1) invented by them being fitted into a car marketed under their name. This car had only two forward speeds and was equipped with two automatic friction clutches. The clutches were engaged by centrifugal masses rotating at engine speed. One clutch, which engaged at a relatively low speed, gave a low car speed through double-reduction spur gears, while the other, which engaged at a higher speed, gave a direct drive by clutching the main drive shaft to the crankshaft or flywheel. When the direct drive was picked up the low gear was rendered ineffective by a free-wheeling unit incorporated in the driven member of the first-reduction pair. The Sturtevant car did not go into mass production, but whether its failure was due mainly to faults in its automatic transmission would be hard to determine at this late date.

Many of the early cars had only two forward speeds, and as engine powers and car speeds increased the inadequacy of such transmissions became more and more evident. It soon became recognized that the ideal would be a transmission which, instead of giving only two or three fixed torque ratios, would permit of continuous variation of the ratio from the maximum required to enable the engine to produce the desired top acceleration, to the minimum which would not overload the engine under normal driving conditions. Such transmissions became known as infinitely variable gears.

An early form of infinitely variable gear was the friction-disk drive, which was used more or less successfully on a number of relatively light passenger cars and trucks. In the conventional form, in which the disk was the driving member, trouble frequently was caused by flat spots on the wheel, which would form quickly if the car become stalled and the driver kept the engine running and held the friction members in engagement. With such a flat spot on the wheel the drive would be very "bumpy," the effect being similar to that of a flat wheel on a railroad coach.

With increase in engine power it became more and more difficult to transmit the power without excessive slip. The friction drive, moreover, did not lend itself to automatic control. Attention therefore shifted to other types of infinitely variable transmissions. Much

## By P. M. Heldt

effort was devoted to the development of devices of this type during the second and third decades of the current century, but although some very ingenious mechanisms were produced, none of them achieved any commercial success. In all of them the power was transmitted in the form of impulses of variable magnitude, from one shaft to another, through a roller ratchet or equivalent device. These devices had two principal shortcomings. One was that, owing to the very high dynamic stresses at the lines or strips of contact between the rollers and their supporting surfaces, their life usually was quite short; the other, that at low car speeds the drive was always jerky or fluctuating.

About 1930 attention was first directed to the possibilities of hydro-kinetic torque converters in the automotive field. This converter was invented by Dr. Herrmann Foettinger of Hamburg, and was first used as a speed reducer for marine steam turbines. It was extensively used in that field until the present type of high-speed reduction gear with helical or double helical teeth was developed. With three rows of blades or vanes in a single housing, one acting as impeller, another as runner, and the third as a reaction member, such a converter automatically changes the ratio of output torque to input torque as the driven member is brought up to speed, as well as when the driven member slows down relative to the driving member. This feature, however, seems to have been of no particular importance in the marine field, where the device served essentially the same purpose as the conventional speed reducer of an industrial electric motor.

The advantages of the hydraulic torque converter were readily recognized. These include smoothness of operation under all conditions, freedom from wear and tear on the working parts, protection of the engine against overload at low speeds, and silent operation. With a hydraulic unit in the transmission line it is impossible to cause the engine to "lug" at low speeds, because the unit will not take the maximum engine torque within that speed range. It is under conditions of high torque load at low speeds that engine detonation generally is most severe, hence when the drive is transmitted hydraulically the engine will be less prone to knock and can be operated satisfactorily on a fuel of lower octane number. It is also claimed that the tendency of a car to skid while coasting on slippery pavement is reduced by the hydraulic unit. Under these conditions the road wheels are kept turning by momentum and the force of gravity, while the friction torque of the engine tends to stop them. Any sudden increase in the retarding torque tends to cause the wheels to slide or to reduce their grip on the road. With hydraulic drive the changes in the retarding torque impressed on the propeller shaft will be gradual, in contrast to the effect produced by a conventional clutch and transmission. This tends to keep the road wheels "geared to the road" and to prevent skidding.

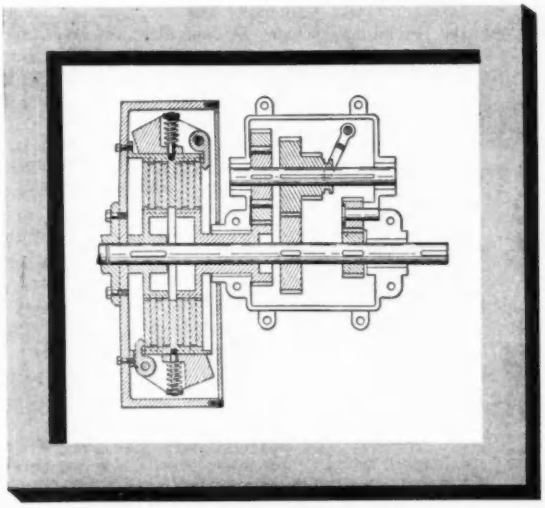


*Fig. 1—Sturtevant automatic transmission, believed to be the first used on an American-built car.*

However, when it was attempted to use hydro-kinetic torque converters in the automobile field it was found that they had serious limitations. The efficiency of these transmissions is very low at low car speeds, starting at zero while the car is at a standstill, gradually working up to a maximum which is somewhere between 80 and 90 per cent in a well-designed unit, and then dropping back toward zero rather rapidly as the output speed approaches the input speed, which it cannot possibly reach as long as power is required for propulsion. That the efficiency is low when the car is first set in

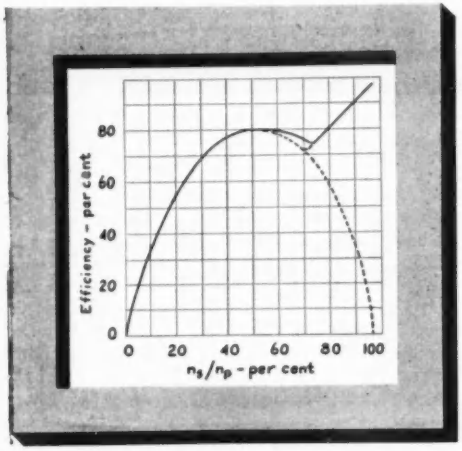



*Fig. 2—Efficiency curve for Trilock transmission.*

motion is of no particular consequence, since the overall efficiency of the drive is equally low in a conventional car, where the greater part of the loss under these conditions occurs in the friction clutch, and only a small part in the transmission proper. But with the output shaft turning at, say, 70 per cent the speed of the input shaft the efficiency is entirely too low to be tolerable in continuous operation. A consideration of its efficiency characteristics made it evident that on motor vehicles a hydraulic torque converter could be used to advantage only for acceleration through the lower speed range, to bring the car up to a speed ordinarily attained in intermediate gear. The remainder of the acceleration and all normal driving in the upper speed range must then be done in direct drive.

Hydro-kinetic torque converters will transmit power in one direction only, and an automobile transmission therefore must have a separate reverse gear.

An automotive-type transmission combining a hydro-kinetic torque converter with a direct-drive friction clutch and a reversing gear was first produced by Alf Lysholm, chief engineer of the Ljungstrom Steam Turbine Co. of Stockholm, Sweden, and was developed there and in the works of Leyland Motors Co. in England, into whose buses it was first fitted. It is known as the Lysholm-Smith transmission. Some years later a transmission built under the same patents was adopted for its buses by what is now the Truck and Coach Division of General Motors Corp. Originally a positive clutch provided with synchronizing cones was used to obtain the direct drive, but this did not prove entirely satisfactory, and a friction clutch was substituted for the jaw clutch later. A second friction clutch is needed to disengage the impeller of the torque converter from the crankshaft when the vehicle is in direct drive, as otherwise the fluid would then be circulated through the converter, which would result in power losses. The two friction clutches are combined into one unit.

In 1933 an interesting innovation was made in railway and automotive hydraulic torque converters by a firm in Frankenthal, Palatinate, Germany, which produced the so-called Trilok transmission. In the latter a fluid coupling is combined with the converter by merely mounting the reactor on a free-wheeling unit in such a way that it can rotate with the impeller but not in the opposite direction. A technical description of this transmission appeared in the VDI Zeitschrift for Nov. 10, 1934, accompanied by performance curves, in which the torque ratio, the efficiency, and the impeller speed were plotted against the runner speed in percentages of its nominal value. In Fig. 2 the efficiency has been replotted (solid line) on a base scale representing the ratio of runner speed to impeller speed. It appears, however, that the last portion of the curve referring to converter action is somewhat "optimistic," because if converter action continued until the maximum runner speed was attained the curve should meet the base line a considerable distance to the left of the 100 per cent point, whereas the present curve, if continued, would not meet the base line at all but would indicate approximately 50 per cent efficiency with the runner turning at impeller speed, which is an impossibility. More likely the efficiency curve would have a shape similar to that shown dotted. Converter action then would cease when the runner turns at approximately 70 per cent impeller speed and the efficiency is close to 70 per cent. At that point coupling action would begin, and beyond it the efficiency would rise rapidly. The curve relates to the maximum torque which the unit will transmit for a given impeller speed and a given "slip" as determined by the ratio of runner speed to impeller speed. If the torque transmitted at any given speed is less, the efficiency will be higher.

From the efficiency curve of Fig. 2 it is quite obvious that the plain three-member torque converter cannot be used to advantage to provide the entire range of speed multiplication required in a motor vehicle. With some converters designed to give a high stalling torque the maximum efficiency is reached at an even lower speed than in Fig. 2, corresponding to a reduction ratio of about 2.5 to 1, and the converter action ceases and coupling action begins when the reduction ratio is about 1.6 to 1. This is about the same as that of the intermediate gear in a conventional three-speed transmission. Under these conditions the efficiency would drop to a minimum of about 62.5 per cent, which is much lower than the average efficiency of a conventional transmission in intermediate gear. That the efficiencies of hydro-kinetic converters are relatively low is indicated by the fact that it is customary to use special oil coolers with them, which the ordinary transmission does not need.

The problem which has confronted transmission designers in recent years therefore has been to so modify the hydro-kinetic torque converter that its average efficiency would be materially raised. The losses in these converters are of two kinds, flow losses and shock losses. Flow losses result from the shearing action between adjacent layers of oil molecules, particularly close to the solid surfaces with which the fluid is in contact. They can be reduced by using

(*Turn to page* 90, *please*)

# Cummins Introduces New High-Power V-12 Diesels

THREE new Diesel engines have been announced by the Cummins Engine Co., Inc., Columbus, Ind. They are designated as the NVH series, which includes the naturally-aspirated NVH-1200 and the supercharged NVHS-1200, and the HRBS-600 model.

Model NVHS is a 12-cyl, four stroke supercharged V-type engine with a maximum rating of 550 hp at 2100 rpm. The NVH-1200 is rated at 400 hp at 2100 rpm. Both the NVH and the NVHS engines have a bore of 5⅛ in., and a stroke of 6 in. and a piston displacement of 1486 cu in. Cylinders of both engines are equipped with removable wet liners. They are set at a 40-deg "V" angle. The cylinder heads are of aluminum, one casting for each three cylinders.

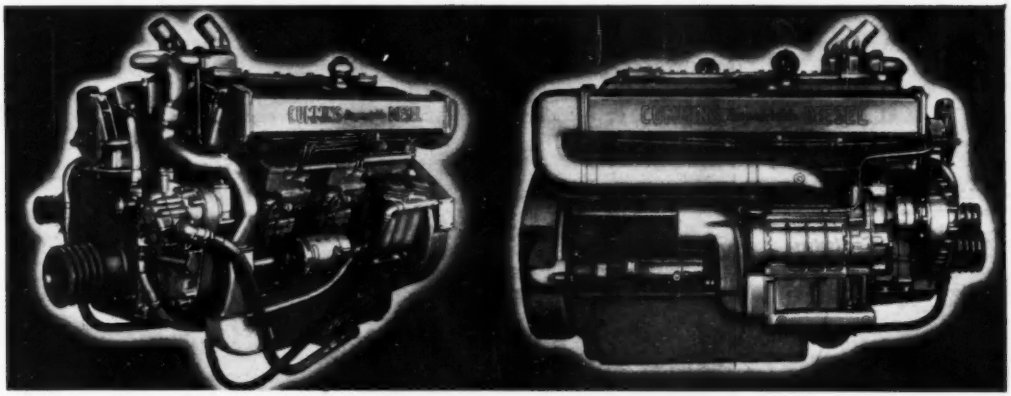
The connecting rods are mounted side by side on the crank pins of a conventional six-throw, counterweighted crankshaft. Main bearings and rod bearings are of the precision interchangeable type. All journals and pins of the crankshaft are Tocco hardened. A viscous friction damper is available to control torsional vibration and will allow a wide speed range for special applications. Full-force feed lubrication is delivered by a gear pump through a filter and water-jacketed oil cooler.

The pistons, of heat-treated aluminum, incorporate the Cummins "Sneezer" design. In addition, the piston skirts have a knurled surface, of diamond pattern. The piston rings are of keystone section, and the top ring is chrome plated.

Valves and injectors are located in the cylinder head, actuated through rocker arms from twin camshafts. Exhaust valve seats are Stellite inserts. In the gear train driving the camshafts, provision is made for driving the water pump, oil pump, fuel pump and other accessories.

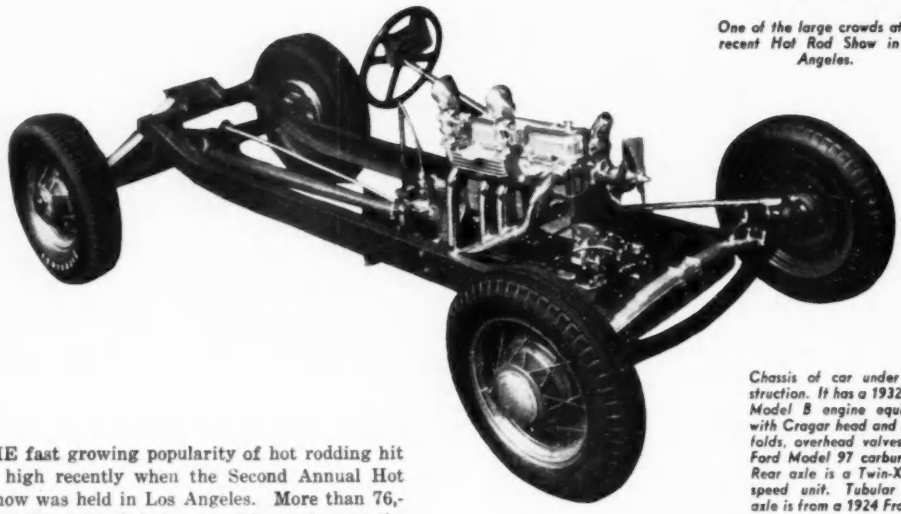
These new engines are equipped with a completely new Cummins single-plunger fuel pump. The fuel is delivered to the injectors at low pressure through a rotating distributor disk arrangement. The new pump contains a double disk arrangement from which it gets its name, the "DD" pump. One disk allows fuel to pass into the metering pump, while the other performs the distribution function only. Two of these

(*Turn to page* 86, *please*)



*Shown at the left is the fuel pump side of Model NVHS-12 Cummins Diesel showing the new Cummins DD fuel pump, two of which are located directly above the generator. This 550-hp supercharged engine weighs approximately 8.3 lb per maximum rated horsepower. At the right is the manifold side of the Model NVHS-12 Cummins Diesel. This V-type engine develops 550 hp at 2100 rpm. A naturally aspirated version, the Model NVH-12, with the same bore and stroke produces a maximum of 400 hp at 2100 rpm.*

One of the large crowds at the recent Hot Rod Show in Los Angeles.



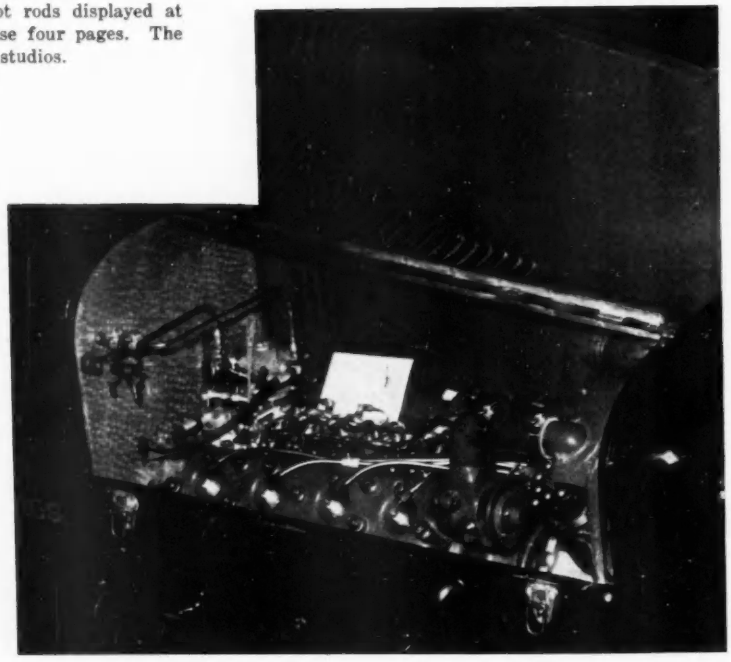
Chassis of car under construction. It has a 1932 Ford Model B engine equipped with Cragar head and manifolds, overhead valves, and Ford Model 97 carburetors. Rear axle is a Twin-X two-speed unit. Tubular front axle is from a 1924 Franklin.

# $150,000

THE fast growing popularity of hot rodding hit a new high recently when the Second Annual Hot Rod Show was held in Los Angeles. More than 76,000 spectators attended the exposition to inspect the latest innovations in speed and power equipment. Forty-eight originally designed cars valued at $150,000 were on display and over 60 manufacturers exhibited automotive equipment.

With hot rodding beginning to assume national scope, plans are being made to expand the next show and invite owners of originally-designed cars in every state of the nation to exhibit them.

Some of the outstanding hot rods displayed at Los Angeles are shown on these four pages. The pictures were made by Lennie studios.



Ford 1934 V-8 engine in Hilborn hot rod which was timed at 150.50 mph. It has modified Ford heads and special pistons. Car features unique fuel injection system with eight venturi tubes, each with its own butterfly valve and injection nozzle

# Worth of Hot Rods

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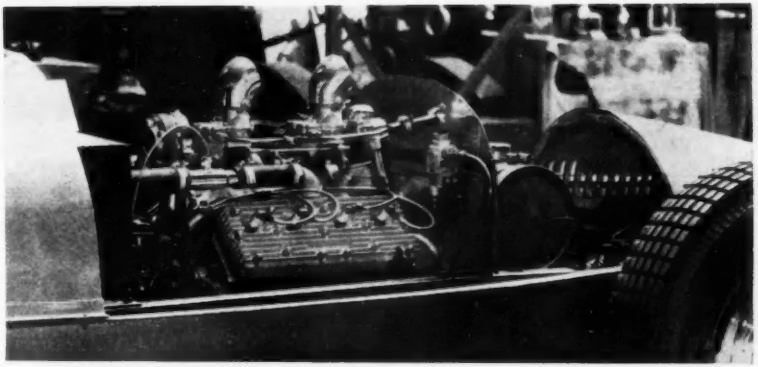
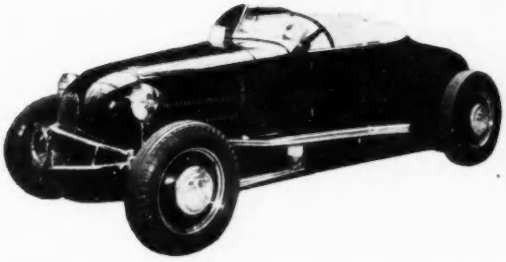
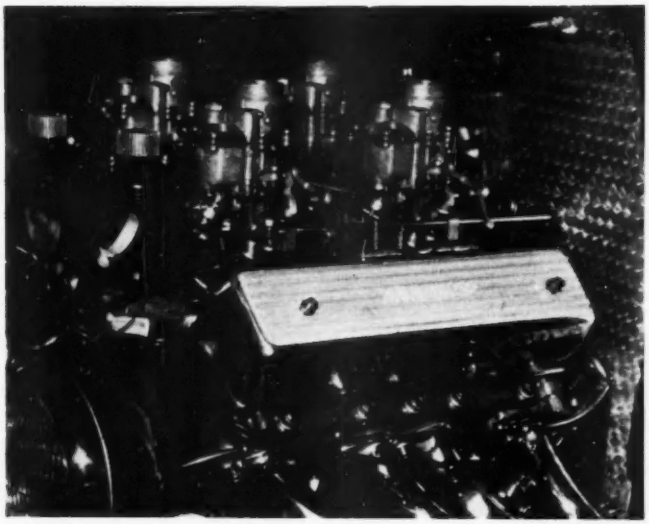


*1939 Ford V-8-60 engine in Xydias hot rod which was clocked at 132.93 mph. Its equipment includes Edelbrock heads, manifolds, and pistons, Winfield camshaft, and Kong ignition.*



*Top speed of this hot rod car is 125 mph. Model T 1927 body is mounted on 1932 Ford frame. The engine is 1940 Mercury with Navarro heads and manifolds, Smith camshaft, Spalding ignition and two Ford Model 97 carburetors.*



*Closeup of modified 1946 Mercury engine for hot rod use. It is equipped with Cummings heads, overhead camshafts and valves, four carburetors, and dual ignition system consisting of two coils, two distributors, and two spark plugs per cylinder.*

# Hot

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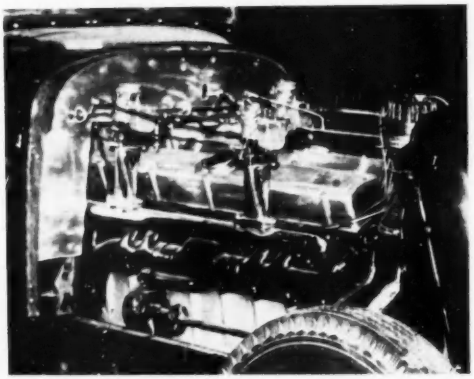
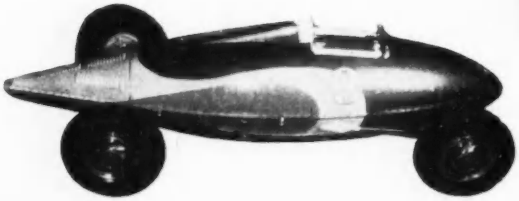


*Burke-Francisco Streamliner that holds Southern California Timing Association speed record at 153.32 mph. It is powered by a 1946 Mercury engine, located back of the driver and equipped with Edelbrock heads and manifolds, Harmon and Collins camshaft, Spalding ignition, and two Model 48 Ford carburetors. Fuel is methanol. Body was made from P-38 wing tank. Frame is Ford 1924 Model T unit.*

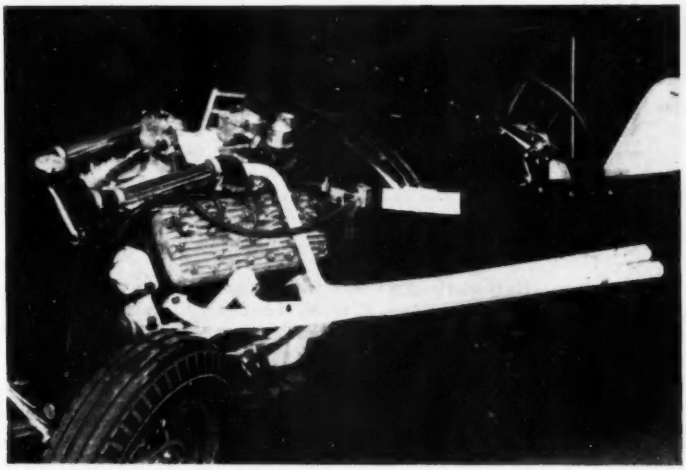


*Closeup of 1930 Cadillac V-16 engine in Jones hot rod that was clocked at 132.23 mph. It has four Model 97 carburetors and Winfield camshaft.*

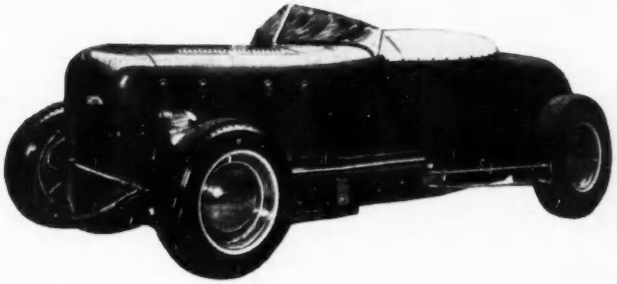
*Tattersfield hot rod with rear-mounted Mercury engine. Tattersfield-Barron heads and manifolds, four Ford Model 97 carburetors, and Hunt magnetos. It has a quick-change rear end. Fuel is methanol.*

# Rods

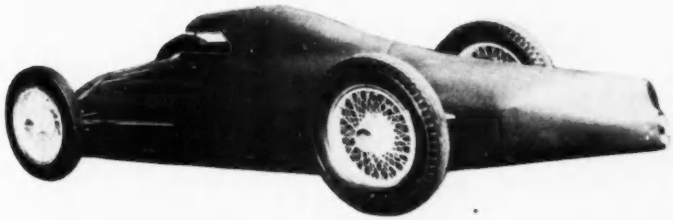
*preceding pages*



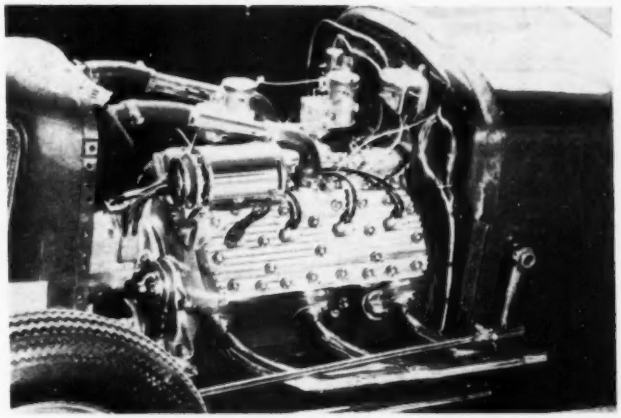
*Vogel car with modified 1946 Mercury engine, independent front wheel suspension system and coil springs in rear. Body is 1927 Model T on tubular frame.*



*Webb hot rod intended primarily for city operation, featuring appearance rather than speed. Components include 1929 Ford body, 1932 Ford frame and Mercury engine. It is painted with 20 coats of lavender lacquer.*



*Designed for high speed events on dry lake, this car is powered by a recent Pontiac six engine mounted at the rear and canted 30 deg from vertical to reduce height. Its ground clearance is 3½ in. The body is aluminum.*



*Output of this Mercury engine in Clem car is raised by Weiand heads and manifolds, two Ford Model 97 carburetors, and dual magnetos.*

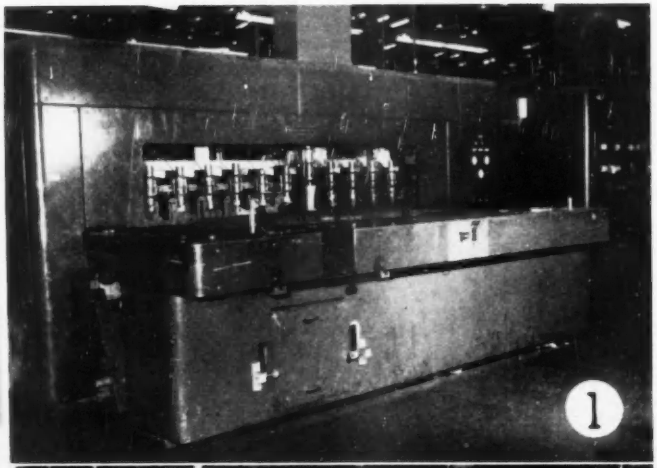
# Four Applications of Induction Heating

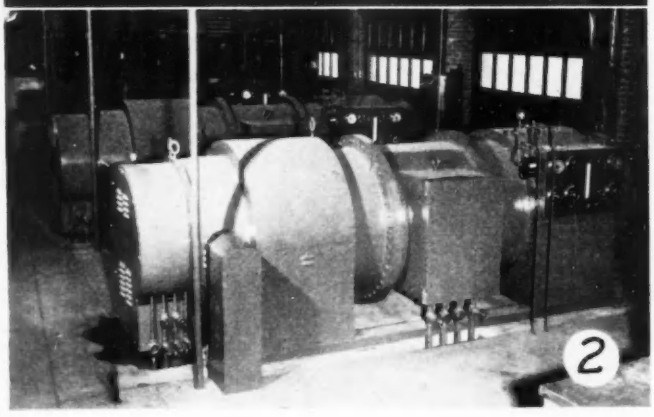
INTERNATIONAL Harvester's experience with induction hardening dates from 1936 at which time the first installation was made, hardening bearing surfaces on tractor crankshafts. In 1939, a spark gap unit was purchased and radio-frequency hardening was applied to small gears, shifter rails, and miscellaneous small parts.

From this beginning, Harvester's induction heating program grew steadily with the addition of vacuum tube and generator type machines for hardening, a large installation for soldering radiators with induction, and many applications of induction hardening and brazing to the company's war work.

A development program on induction hardening of transmission gears was begun in 1944 to investigate its feasibility and to develop production methods. This program was carried out by cooperative research, using a large experimental installation at Harvester's Farmall Works and research laboratories of several major equipment manufacturers.

In 1945, Harvester was completing plans for its largest tractor plant to produce new lines of tractors at Louisville, Ky. The construction of an entirely new plant presented a challenge to the company's faith in induction heating. This method has been utilized to the fullest extent in the new plant in heating for forging, hardening, tempering, brazing, soldering, and shrinking. The Louisville Works now uses over 6000 kva in power, ranging from 60 cycles to 450,000 cycles.




### Applications in Forging

The entire forge shop, consisting of four upsetters, five presses and two bulldozers, is equipped with induction heaters, heating approximately 16,000 lb of steel per hour, from one in. round to 4¼ in. square in section. The steel is heated in a continuous billet heater in which sheared lengths push each other through an induction coil, or in a bar heater in which one end of a bar is heated to a specified length. In the larger sizes, heat application favors the surface, but temperature is equalized during

*1. High speed automatic machine for radio frequency hardening of transmission gears. Production rates up to 800 gears per hour have been attained.*

*2. Hydrogen-cooled 3000 cycle generators which furnish power to heating units.*

# in Making Tractor Parts

By J. D. Graham,
Works Metallurgist,
and H. F. Kincaid,
Assistant Works Metallurgist,
Farmall Works, Farm Tractor Division;
and R. E. McGee,
Supervisor, Metallurgical
Research, Manufacturing Research Department,
International Harvester Co.

the transfer of the heated steel from the heating unit to the forging machine. Power for these heaters is supplied by three hydrogen-cooled 3000 cycle generators each of 1250 kw capacity and four water cooled 9600-cycle generators, each of 150 kw capacity.

IHC has found that the use of induction heat in the forge shop results in increased production as no furnace warm up or wait for bar heating is required; Formation of very light scale, as well as uniform temperatures, extend die life measurably; due to the absence of scaling and decarburization, smaller stock sizes may be used with less stock removal in machining, which reduces material cost; working conditions are improved since the heating unit remains cool.

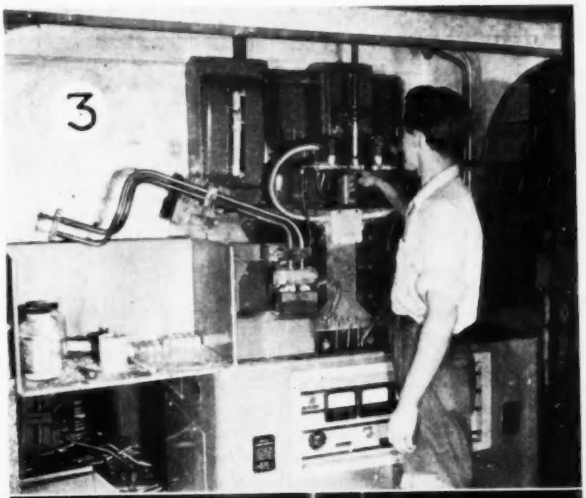
### Heat Treating Techniques

The techniques of heat treating by induction at Louisville Works vary greatly with a total of 1560 kw power at frequencies from 60 cycles to 450,000 cycles. Choice of frequency, power, quench-hardness pattern, etc., is of extreme importance in application of induction heat, and is based on experience. The work at Louisville may be roughly grouped as follows:

1. Heavy gears—six pitch and heavier. Preheat with 60 cycles to about 700 F. Heat teeth with 9600 cycles to hardening temperatures and quench in high pressure oil in submerged spray at 40-90 psi. Hardness pattern is through teeth and below root diameter.

2. Lighter spur gears — seven pitch and lighter. Preheat to about 1000 F with 9600 cycles, heat teeth to hardening temperature with very short application of 250,000 cycle power (.8 second max.),

(*Turn to page* 88, *please*)




*3. This 20-kw, 9600 cycle unit handles silver brazing of hydraulic tube assemblies.*

*4. Bull gears are heated for shrinking onto hubs in this low-frequency (60 cycle) unit.*

# General News

(*Continued from page 23*)

### February Rubber Consumption Topped 81,000 Tons

Consumption of new rubber during the month of February totaled 81,598 long tons according to the monthly estimate of the Rubber Manufacturers Association, Inc. This was about seven per cent less than the January consumption of 87,756 tons.

### 1949 MOTOR VEHICLE FACTORY SALES FROM U. S. PLANTS*

| | Passenger Cars | Trucks | Buses | Totals 1949 | Totals 1948 |
|---|---|---|---|---|---|
| January | 326,019 | 104,599 | 658 | 431,276 | 405,663 |
| February | 324,547 | 101,700 | 418 | 426,665 | 383,002 |
| Total—Two Months | 650,566 | 206,299 | 1,076 | 857,941 | 788,665 |

### 1949 FACTORY SALES TO DOMESTIC AND FOREIGN MARKETS*

| | Passenger Cars | | Trucks | | Buses | |
|---|---|---|---|---|---|---|
| | Domestic | Foreign | Domestic | Foreign | Domestic | Foreign |
| January | 312,199 | 13,820 | 91,282 | 13,317 | 618 | 40 |
| February | 310,343 | 14,204 | 80,540 | 13,160 | 326 | 92 |
| Total—Two Months | 622,542 | 28,024 | 170,822 | 26,477 | 944 | 132 |

* Automobile Manufacturers Association.

### Miller Gets Public Relations Award

Chet Miller, in charge of public relations at Douglas Aircraft Co., El Segundo, Calif., has received the American Public Relations Association award for outstanding performance. Mr. Miller won the award for public education on modern aircraft developments during 1947 and 1948.

### GM Names Morse as Head of Suggestion Plan

Donald G. Morse has been named director of GM's employe suggestion plan section of the employe relations staff, succeeding the late John M. Jerpe.

### Fairchild's Ranger Engine Div. Get's GE Jet Contract

Following the receipt of contracts from the General Electric Co., the Fairchild Engine and Airplane Corp.'s Ranger Engines Div. is starting production of major component parts for the GE J-47 tubo-jet engine.

## Specifications of All German Trucks Tabulated by Gunther

| (1-17-Trucks) (18-20-Buses) | MAKE | Model | GENERAL CHASSIS DATA: Payload (Trucks — Tons) (Buses — Seats) | Drive | Front Tire Size | Rear Tire Size | Wheelbase (in.) | Tread, Front (in.) | Tread, Rear (in.) | Ground Clearance (in.) | Chassis Weight (lb) | GVW (lb) | Make | Model | Cycle | Fuel | No. of Cylinders | Arrangement of Cylinders |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Borgward | B1000 | 1 | 4x2 | 5.50/16 | 6.00/20S | 110 | 52.75 | 52 | 6.66 | 1655 | 5300 | O | 4M1.4L | 4 | G | 4 | I |
| 2 | Borgward | B3000S/B | 3 | 4x2 | 7.50/20 | 7.50/20D | 146 | 64.6 | 63 | 9.28 | 3520 | 13650 | O | 6B3.8 | 4 | G | 6 | I |
| 3 | Borgward | B3000S/D | 3 | 4x2 | 7.50/20 | 7.50/20D | 146 | 64.6 | 63 | 9.25 | 3960 | 14000 | O | D6M5 | 4 | D | 6 | I |
| 4 | Büssing-NAG | 5000S | 5 | 4x2 | 10.00/20 | 10.00/20D | 189 | 75.6 | 67.7 | 11.6 | 9030 | 23360 | O | LD | 4 | D | 8 | I |
| 5 | Daimler-Benz | 170V | ¾ | 4x2 | 5.50/16 | 5.50/16S | 112 | 51.6 | 51 | 8.07 | 1655 | 4380 | O | M136 | 4 | G | 4 | I |
| 6 | Daimler (Opel) | 701-3, 6-36S | 3 | 4x2 | 7.50/20 | 7.50/20D | 142 | 61.2 | 64.7 | 9.65 | 3740 | 12800 | O-Op | 3.6 Ltr. | 4 | G | 6 | I |
| 7 | Daimler-Benz | L4500S | 4½ | 4x2 | 10.00/20 | 10.00/20D | 181 | 73.5 | 68 | 14 | 8700 | 22290 | O | OM67/4 | 4 | D | 6 | I |
| 8 | Ford | V3000S/III | 3 | 4x2 | 7.50/20 | 7.50/20D | 158 | 65 | 65 | 9.85 | 3680 | 12960 | O | G28T | 4 | G | 4 | I |
| 9 | Ford | V3000S | 3 | 4x2 | 7.50/20 | 7.50/20D | 158 | 65 | 65 | 9.85 | 4025 | 12960 | O | V8-3.9 Ltr. | 4 | G | 8 | V |
| 10 | Ford | G610TS | 3 | 4x2 | 7.50/20 | 7.50/20D | 158 | 65 | 65 | 9.85 | 3810 | 12960 | O | V8-3.6 Ltr. | 4 | G | 8 | V |
| 11 | Moto-Standard (Gutbrod) | 504 | ¾ | 4x2 | 5.50/16 | 5.50/16S | 117 | 41.4 | 52.6 | 7.09 | 770 | 3300 | O-Hi | 4Z-50-A | 2 | G | 4 | H |
| 12 | Klockner (Magirus) | S3000W | 3 | 4x2 | 7.50/20 | 7.50/20D | 166 | 61.8 | 61.4 | 9.45 | 5120 | 14300 | O-De | F4M513 | 4 | D | 4 | I |
| 13 | Klockner (Magirus) | S3000L | 3 | 4x2 | 7.50/20 | 7.50/20D | 166 | 61.8 | 61.4 | 9.45 | 5120 | 14300 | O-De | F4L514 | 4 | D | 4 | I |
| 14 | M. A. N. | MK | 5 | 4x2 | 10.00/20 | 10.00/20D | 181 | 74.8 | 68 | 13 | 8800 | 23200 | O | D1040G2 | 4 | D | 6 | I |
| 15 | Opel (G. M. C.) | 2.5-45 | 1½ | x2 | 6.00/18 | 6.00/18D | 128 | 53 | 58 | 8.27 | 2460 | 7500 | O | 2.5 L r. | 4 | G | 6 | I |
| 16 | Südwerke (Krupp) | L45 | 4½ | 4x2 | 10.00/20 | 10.00/20D | 173 | 73 | 70.7 | 11 | 7700 | 21200 | O-Kr | M12a | 4 | G | 6 | I |
| 17 | Tempo (Vidal) | A400 | ½ | 3x1 | 5.25/16 | 5.50/16S | 125 | ..... | 54 | 7.09 | 770 | 3480 | Jto | WEGR/200T | 2 | G | 2 | I |
| 18 | Büssing-NAG | 5000T | 53 | 4x2 | 10.00/20 | 10.00/20D | 177 | 73.1 | 67.8 | 11.5 | 9900 | 24200 | O | LD | 4 | D | 8 | I |
| 19 | Ford | G-790-B | 33 | 4x2 | 7.50/20 | 7.50/20D | 209 | 65 | 65 | 9.85 | 4100 | 14220 | O | V8-3.9 Ltr. | 4 | G | 8 | V |
| 20 | Krauss-Maffei | KMO-130 | 50 | 4x2 | 10.00/20 | 10.00/20D | 227 | 73.3 | 68 | 9.85 | 9250 | 25200 | O-Ma | HL64 | 4 | G | 6 | I |

**ABBREVIATIONS**

A—Air
AW—All wheel
BG—Bevel gear
CL—Cam and lever
D—Diesel fuel
D—Dual tires
De—Deutz
DR—Double reduction
FS—Fichtel & Sachs
G—Gasoline
H—Horizontal opposed
He—Hermes
Hi—Hirth
Hy—Hydraulic
I—Valves in head
I—Cylinders in line
Kr—Krupp
L—L-head (side valves)
M—M. A. N.
Ma—Maybach

### Name Admiral Ramsey Head of Aircraft Industries Group

Admiral DeWitt C. Ramsey, retiring Commander in Chief of the Pacific Fleet, U. S. Navy, has been elected president of the Aircraft Industries Association.

### Fisher & Ludlow of England Independent Company

It was incorrectly stated in the March 1, 1949 issue of AUTOMOTIVE INDUSTRIES in a picture caption entitled "Done to a Turn" that Fisher & Ludlow of England was a subsidiary of the Standard Motor Co. Fisher & Ludlow Ltd. is an entirely independent company.

### Correction to Article on Hydraulic Valve Lifters

Referring to the article describing the manufacture of hydraulic valve lifters by the Diesel Equipment Div., GMC, which appeared in AUTOMOTIVE INDUSTRIES, Feb. 15, 1949, our attention is drawn to an error in identifying an important piece of equipment. It should be noted that all of the initial machining operations on bodies and plungers—of all sizes—are performed in National Acme-Gridley automatics. This plant boasts a large battery of these well known automatics of latest types. Needless to say, we are happy to credit National Acme with this outstanding set-up.

### 1948 SHIPMENTS OF CIVIL AIRCRAFT AND AIRCRAFT ENGINES AND OTHER PRODUCTS OF THEIR PLANTS.*

| | January 1949 | December 1948 |
|---|---|---|
| Civil Aircraft | 180 | 235 |
| Personal Planes: | | |
| Number | 151 | 209 |
| Value | $936,784 | $1,107,600 |
| Transport Planes: | | |
| Number | 9 | 26 |
| Value | $2,630,098 | $6,389,338 |
| Aircraft Parts—Value | $2,350,357 | $2,325,957 |
| All Other Products—Value | $1,495,899 | $1,991,829 |
| Total—Value of Civil Aircraft, Parts and Other Products | $7,413,139 | $11,814,724 |
| Civil Aircraft Engines: | | |
| Number of Engines | 266 | 310 |
| Value of Engines | $1,351,488 | $1,238,281 |
| Value of Engine Parts | $1,732,690 | $1,945,517 |
| Value of All Other Products | $151,119 | $146,026 |
| Total—Value of All Products of Civil Aircraft Engine Plants | $3,235,297 | $3,429,824 |

*—Bureau of the Census and Civil Aeronautics Administration.

## and Buses, 1948-1949

## Papenbroock, Hamburg, Germany

| ENGINE | | | | | | | | | Clutch | | Transmission | | Rear Axle | | | Front Axle | Steering | | | Brakes | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bore (in.) | Stroke (in.) | Piston Displacement (cu in.) | Compression Ratio | Continuous BHP at RPM | Max. Torque (lb ft) at RPM | Cooling System | No. of Main Bearings | Valve Location | Make | No. of Dry Disks | Make | Forward Speeds | Make | Final Drive | Gear Ratio | Make | Make | Type | Minimum Turning Diameter (ft) | Make | Type | Foot Brake Operates On | Hand Brake Operates On |
| 2.64 | 3.35 | 84.5 | 6 | 29-3000 | 56.4-2000 | W | 3 | I | O | 1 | O | 4 | O | BG | 6.57 | O | O | WG | 39.4 | Pe | Me | AW | AW |
| 3.35 | 4.33 | 228.5 | 6 | 78-3000 | 159-1500 | W | 4 | I | FS | 1 | O | 5 | O | BG | 5.83 | O | Ro | CL | 44.3 | Te | Hy | AW | RW |
| 3.54 | 5.12 | 302.5 | 16.5 | 70-2000 | 206-1400 | W | 7 | I | FS | 1 | O | 5 | O | BG | 5.83 | O | M0 | WG | 44.3 | Te | Hy | AW | RW |
| 4.33 | 5.12 | 452.5 | 16.5 | 105-1800 | 325.5-1200 | W | 7 | I | O | 2 | O | 5 | O | DR | 8.0 | O | O | WG | 57.7 | Se+Te | A+Hy | AW | Tr |
| 2.9 | 3.94 | 103.5 | 6 | 38-3400 | 70.6-1700 | W | 3 | L | FS | 1 | O | 4 | O | BG | 4.774 | O | Ro | CL | 36.1 | Te | Hy | AW | RW |
| 3.54 | 3.74 | 221.5 | 6 | 75-3200 | 152-1400 | W | 4 | I | O-Op | 1 | O-Op | 5 | O-Op | BG | 6.83 | O-Op | O-Op | WR | 43 | Te | Hy | AW | RW |
| 4.14 | 5.52 | 443 | 21.5 | 112-2250 | 296-1450 | W | 7 | I | FS | 1 | ZF | 5 | O-M | DR | 9.2 | O | Ro | CL | 63.3 | Se+Te | A+Hy | AW | RW |
| 3.87 | 4.25 | 200 | 4.6 | 60-2600 | 132-1200 | W | 3 | L | O | 1 | O | 4 | O | BG | 6.66 | O | O | WR | 45.9 | O+Te | Hy | AW | RW |
| 3.18 | 3.75 | 239 | 5.9 | 95-3500 | 170-1750 | W | 3 | L | O | 1 | O | 4 | O | BG | 6.66 | O | O | WR | 45.9 | O+Te | Hy | AW | RW |
| 3.07 | 3.75 | 220 | 6.12 | 85-3600 | 136-1900 | W | 3 | L | O | 1 | O | 4 | O | BG | 6.66 | O | O | WR | 45.9 | O+Te | Hy | AW | RW |
| 2.05 | 2.28 | 30 | 6.2 | 12-4000 | 21-2500 | A | 3 | .. | O | 1 | ZF | 3 | O | BG | 5.0 | O | O | PR | 38.1 | O | Me | AW | AW |
| 4.33 | 5.12 | 301 | 22 | 70-2100 | 196.7-1400 | W | 5 | I | FS | 1 | ZF | 5 | O | BG | 6.8 | O | Ro | CL | 52.4 | Te | Hy | AW | RW |
| 4.33 | 5.52 | 324 | 17 | 70-2100 | 195-1300 | A | 5 | I | FS | 1 | ZF | 5 | O | BG | 6.8 | O | Ro | CL | 52.4 | Te | Hy | AW | RW |
| 4.33 | 5.52 | 487 | 17 | 120-2000 | 318-1300 | W | 7 | I | O | 1 | ZF | 5 | O | DR | 9.22 | O | Ro | CL | 59 | Se | A | AW | RW |
| 3.15 | 3.23 | 151 | 6 | 54-3200 | 104.8-1600 | W | 4 | I | O | 1 | O | 4 | O | BG | 5.5 | O | O | WR | 45.9 | Te | Hy | AW | RW |
| 4.02 | 6.3 | 478 | 5 | 100-1600 | 376-1000 | W | 7 | I | O | 1 | ZF | 5 | O | DR | 7.0 | O | Ro | CL | 59 | Se | A | AW | RW |
| 2.4 | 2.68 | 24.2 | 5.8 | 12-3100 | 21.6-2400 | W | 4 | .. | He | MD | He | 3 | O | ..... | 8.48 Front Drive | O | O | WS | 36.1 | Po | Me | AW | AW |
| 4.33 | 5.12 | 452.5 | 16.5 | 105-1800 | 325.5-1200 | W | 7 | I | O | 2 | O | 5 | O | DR | 8.2 | O | O | WG | 57.7 | Se+Te | A+Hy | AW | Tr |
| 3.18 | 3.75 | 239 | 5.9 | 95-3500 | 170-1750 | W | 3 | L | O | 1 | O | 4 | O | BG | 6.66 | O | O | WR | 54.1 | O+Te | Hy | AW | RW |
| 4.14 | 4.73 | 380 | 6.5 | 130-2600 | 300-1000 | W | 7 | I | O | 2 | ZA | 5 | O | DR | 9.2 | O | O | WG | 68.8 | Se | A | AW | RW |

MD—Multiple disk
Me—Mechanical
Mü—Müns
O—Own make
Op—Opel

Pe—Perrot
PR—Pinion and rack
Ro—Z. F.—Ross
RW—Rear wheel
S—Single tires

Se—Several (Bosch, Knorr or West)
Te—Teves—Ate
Tr—Transmission
V—V-Engine
W—Water

WG—Worm and gear
WR—Worm and roller
WS—Worm and segment
ZA—Zahnradfabrik, Augsburg
ZF—Zahnradfabrik, Friedrichshafen

## B-73—Cylinder Block Special Machine

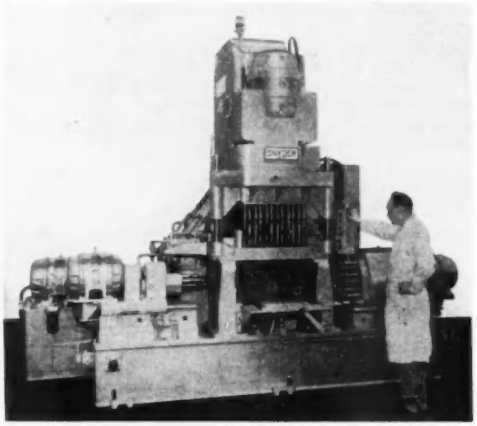
Processing 32 holes every 45 seconds in a six cylinder, cast iron alloy block is the purpose of a new three-way, automatic special machine introduced by Snyder Tool & Engineering Co., Detroit, Mich.

The process comprises counterboring six exhaust valve insert holes, taper reaming six inlet valve passages from the top, counterboring one hole for Welch plug, countersinking two holes in the rear end of the block and countersinking 17 holes in the front end of the block.

Clamping is hydraulic and the work

**NEW**
*Production and Plant*
**EQUIPMENT**

*For additional information please use coupon on page 58*



*Snyder three-way automatic special machine for processing holes in six-cylinder engine blocks*

cycle automatic. The cylinder block is loaded onto an elevator platform and lowered down over solid locating pins. The block is then clamped at both ends by two hydraulically operated wedge clamps. The automatic work cycle is interlocked with the hydraulic clamping mechanism and can be started only when clamping is completed. High speed steel tools are used throughout at speeds ranging from 60 to 90 sfpm. Tool feeds are variable, permitting application of the machine to blocks of varying composition. The two horizontal heads have a stroke of 10 in. and the vertical 12 in. Shaved gears are used in all three heads for smooth, vibrationless operation. The left and right horizontal heads have 5 hp and 7½ hp motors, respectively, and are mounted on 1700-10 slide units. The vertical head is powered by a 15 hp motor and is mounted on a 20-V-16 slide unit on special wishbone type column with standard, counterbalance weight set-up. This heavy duty slide unit is used to furnish the large thrust requirements of the taper reaming and counterboring tools. The wishbone type column allows space directly behind the block for the addition of another unit from the rear. This design also allows for easy chip removal. Base is of welded steel construction, thoroughly ribbed and normalized for rigidity. The machine occupies a floor space 80 in. by 150 in. including the loading shelf in the conveyor line. Production is 77 blocks an hour at 80 per cent capacity.

## B-74—Deep Throat Bed Horn Press

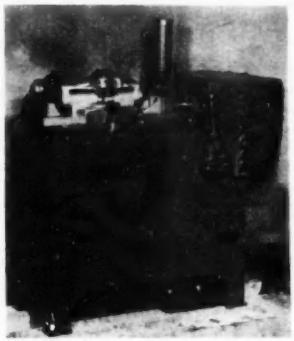
A 5-ton Rousselle deep throat press, No. OG, has been added to the line of deep throat open back inclinable and adjustable bed horn presses of the Service Machine Co., Chicago, Ill. Available in both bench and floor models, the 12 in. throat permits working to the center of 24 in. sheets.

The press has a heavy duty clutch, can be set for single stroke or continuous operation, and operates at 250 strokes per min. The OG bench model, complete with motor, weighs 550 lb.

*Service 5 ton Rousselle deep throat press, No. OG*

## B-75—Automatic Flash Welder

Mass production flash or butt welding, in the light to medium range, by simple push button process with automatic precision control of flashing and upset is a new development of Thomson Electric Welder Co., Lynn, Mass. Called "Synchro-Matic" push up, the development is a feature of the Thomson F Series standard flash and butt welders.



*Thompson F-1 30 KVA flash welder with "Synchro-Matic" push up*

This synchro-matic push up permits high-speed duplication of weld quality, especially in non-ferrous metals, and enables welding of many metals and combinations of metals previously difficult or impossible to weld, the company states. The flash welder feature produces welds in bronzes, brasses, and aluminum and magnesium alloys, as well as in mild or alloy steels. Combinations normally considered impractical such as copper-to-copper or copper-to-aluminum can be welded with ease, it is said.

Motive force for the movable platen of the compact synchro-matic unit is supplied by a double-acting air cylinder controlled by a hydraulic snubbing mechanism. In operation the unit provides an ideal flashing motion claimed not obtainable by any other means. Range of flashing speeds from cycles to seconds is adjustable by knob control.

Calibrated scales are provided for upset and flash-off distances and for current cut-out time. An enlarged calibration on the cut-off switch permits setting to within plus or minus 0.003 in. With this precision control,

the allowance for flash-off in the production welding of parts made of steel can in instances be reduced as much as 50 per cent, it is said.

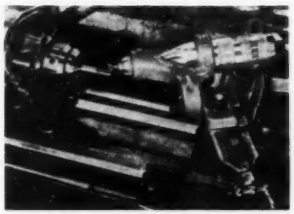
Any type of clamps—manual, pneumatic or hydraulic—and any standard or special tooling can be mounted on the platens which are conventional "table-top" design. Choice of transformer capacities ranges from 30 KVA up.

# NEW Production and Plant EQUIPMENT

*For additional information please use coupon on page 58*

## B-76—Miller-Grinder Machine Tool

A miller-grinder, Super 40, with a speed of 45,000 rpm and over 1/5 hp,



*Precise Super 40 miller-grinder*

is an entirely new tool designed as successor to the 40 grinder-miller, manufactured by the Precise Products Co., Racine, Wis.

With more speed, power, rigidity and accuracy the new tool extends its usefulness into the field of machine tool operations. With or without Coolflex Extension, or in machine set-ups, it operates mounted wheels up to 1¼ in. dia., unmounted wheels, cut-off wheels and metal saws with special arbors up to 2 in. dia. by ¼ in. width, using speed control. It operates HS midget mills and carbide micro mills up to ⅜ in. dia. and 1 in. width. A complete line of tools and accessories adapts the Super 40 to almost any tool or production set-up in standard lathe, milling machine, drill press or other stationary machine tool.

New accessories include the Super Coolflex flexshaft extension, a tool mount, a universal mount, and a line of lathe stands with built-in speed control; also a magni-ray unit for standard and special applications such as wire stripping and mica undercutting. Used as a handtool or with Coolflex attachment the Super 40 also produces mirror finishes (one micro inch and less) on dies and parts through the use of special diamond compounds.

New features of the Super 40 include precision machined aluminum-alloy housing, micro-precision ball bearings that never need lubrication, and increased rigidity and accuracy of quill and collet chuck. The aircooled motor is protected from overload by replaceable Fusetrons and is a complete unit with armature and field assembly in a self-contained cartridge that slips in to the housing. With a speed control, speed can be regulated within a range from 15,000 to 45,000 rpm.

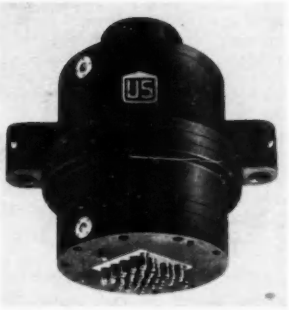
## B-77—Fixed Center Oil Circulating Head

A fixed center oil circulating head has been designed by the U. S. Drill Head Co., Cincinnati, Ohio, mainly for high speeds, although it is useable also for large cluster boxes on way type machines. This 34 spindle in 6 in. sq. head unit has operated at 10,000 rpm with very little heat, it is said.

Designed to eliminate oil seals and other rubbing parts, the head is fully ball bearing equipped. Idler shafts are mounted on ball bearings at each end of the shaft. The ball bearings used on the spindles are of the angular contact type, which holds the runout at the end of the tool to a minimum. The bearings also have high tool thrust capacity.

The head contains an oil pump with a built-in, trouble-free vane type pump, which pumps the oil to the top of the head and by centrifugal force, spreads over its entire upper surface, then cascades down over the bearings and gears.

Claimed ideal for high speed sensitive drilling machines, its castings are of high-grade aluminum alloy. All spindles and shafts are of alloy steel heat-treated and ground.

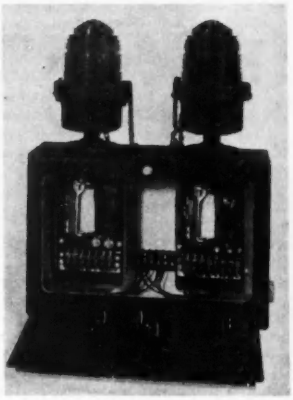



*U. S. Drill fixed center oil circulating head*

## B-78—Light Signal Device

A self-contained light signal device to be used with the P&W model D Electrolimit continuous gage or "flying mike," is a development of the Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn. By means of lights this device signals the operator of a rolling mill continuous inspection line, or a shear, whenever strip material is "off gage." It can also be used to control an external circuit for classifying.

The light signal device consists of one red and one green lantern, two elec-



*Pratt & Whitney light signal device, the Model D Electrolimit continuous gage*

tronic relays, and a mounting case. Limits are set on the contact meter. When these plus and minus limits are exceeded, an electric contact is made through the relays thus providing a control circuit for actuating of mechanisms and lights.

## B-79—Industrial Control Transformers

A new line of industrial control transformers has been brought out by the Industrial Controller Division of the Square D Co., Milwaukee, Wis These Class 9070 Type A control circuit transformers were designed specifically for use with industrial control equipment which is characterized by high momentary inrush currents to the A.C. operating magnet coils. The manufacturer claims the low impedance values of the transformer windings result in unusually good transformer regulation during peak current periods.

To provide secondary circuit protection, either one or two fuse and bracket assembly units can be mounted directly on the transformer. These compact control circuit transformers are built especially for front-wired control panel

use. Accessible screw type terminals permit panel wires to run directly to the transformer, avoiding splices usually required with flexible leads.

The transformers are available in 50, 100, 150, 300 VA at either 50/60 or 25 cycles, and 500 VA at 50/60 cycles, with primary voltages of 220-440 (dual voltage), 550, 440, 380, and 220, and secondary voltages of 110 or 24 volts.

## C-81—Line of A-C Arc Welders

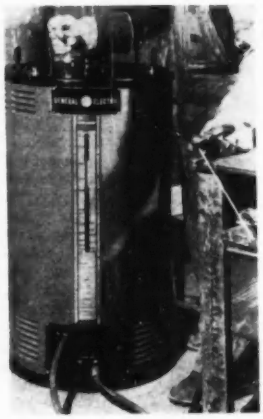
A new line of a-c arc welders, featuring increased welding range and stepless precision current control, has been announced by General Electric's Welding Division, Schenectady, N. Y.

The new welders are available in 200-, 300-, 400-, and 500-amp models for indoor manual welding; 750- and 1000-amp models for machine and submerged melt welding; and a special 200-amp model for light-duty, job-shop welding. The 300-, 400-, and 500-amp models are offered also in weather-resistant enclosures with Idlematic control for both indoor and outdoor operation.

Dual current ranges and increased adjustment overtravel on the new machines provide extra low current range with high maximum short-time output. They are designed with stepless current control, operated by a bearing-mounted current-adjustment crank which enables the operator to make precision settings throughout the current range.

The new welders have an open-circuit voltage of 75 volts, providing good welding performance through added arc stability. Idlematic controls on the weather-resistant models automatically reduce the open circuit voltage on the electrode to about 30 volts, but when the arc is struck the advantage of 75 volt open-circuit voltage is retained.

Increased strength and protection for the welders are provided by the newly designed steel housings. Built-in power factor correction helps to keep power consumption down.

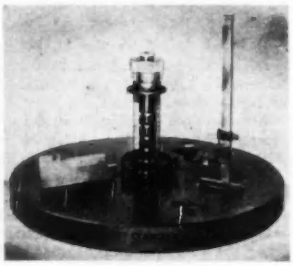


*GE a-c arc welder, 500-amp model*

# NEW ★ PRODUCTS

*For additional information please use coupon on page 58*

## C-82—Ceramic Surface Plate



*Norton ceramic surface plate*

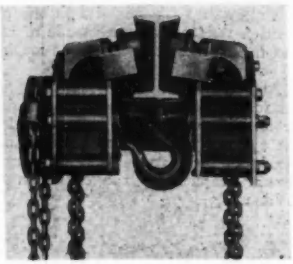
An entirely new ceramic surface plate is released for sale by Norton Co., Worcester, Mass., designed for toolrooms and inspection departments where precision setups and measurement checkings require highest accuracy. The plate affords extreme wear-resistance, a precisely flat surface within 0.0001 in., and a continuously smooth surface finish.

Made of one of the hardest substances known, the plate has revealed in test an almost complete absence of wear either to the plate itself or to gages and instruments used on it, and it is claimed not to warp, deform, give expansion troubles, or deflect under load. Its smooth semi-glossy surface is neither slippery nor sticky and is reported ideal for blueing.

The plate is non-magnetic, and will not sweat or corrode under any atmospheric condition, it is said.

## C-83—Close-To-Beam Trolley Hoist

A new line of Beam-Hugger trolley hoists, reputed to possess the closest head room available in any hand hoist, is offered by David Round & Son, Cleveland, Ohio.



*David Round Beam-Hugger trolley hoist*

The Beam-Hugger is built around the beam, fitting close. When its hook is raised to maximum height, its shank touches the base of the beam. Head room is reduced to the length of the hook only. This construction adds 17 in. to 51 in. more plant working space (depending upon hoist capacity), according to the manufacturer.

Beam-Huggers are manufactured in 13 sizes from one to 24 ton capacities, each hoist available in either plain or geared trolley type. Hoisting mechanism is of the David Round Auto-Bloc type employing two load sheaves with four strands of chain supporting the load.

## C-84—6-Volt D-C Rectifier Unit

Of interest to manufacturers of electrical components for the automotive, aircraft and marine industries, is a rectifier unit of the Mellaphone Electronic Rectifier Co., Inc., Main and Hamilton Sts., Rochester, N. Y., designed to supply DC current for production or laboratory testing of DC motors, solenoids, ignition systems, etc.

An automatic voltage control unit holds the DC voltage exactly at the preset value, regardless of line voltage fluctuations, or variations in the DC

*Mellaphone 6 volt DC rectifier unit*

load, thus assuring uniform test conditions. Selenium rectifiers are said to provide high efficiency long life.

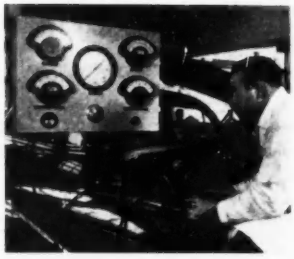
The unit operates from 220 volts AC and delivers 100 amp DC. Its output voltage can be set and maintained with 0.05 volts, anywhere within the range from 0 to 8 volts DC.

Rectification is of the three-phase full-wave type providing smooth output voltage wave shape without need for filtering. Other models fit different voltage and current specifications.

## C-85—New Type Dynamometer

The Proving Stand, new type dynamometer manufactured by the Otis Elevator Co., New York, N. Y., tests performance of passenger cars and light trucks in half the time required for conventional road testing, according to the company. The device creates various road conditions right in the shop simulating pulling under full loads at driving speeds.

Performance characteristics observable while a vehicle is on a proving stand include action of front and rear wheel assemblies, braking force, drag and power loss, lack of balance in brake adjustment, engine acceleration, deceleration, compression, ignition, carburetion, uphill, level and downhill



*Otis proving stand vacuum gage indicating degree of cylinder compression while automobile is being driven under "downhill" conditions*

driving, speed, friction losses, driving force, chassis alignment, and automatic gear shift operation.

Except for body squeaks, rattles, and faults in the steering mechanism, virtually every defect that would be revealed in a road test is claimed will show up on the proving stand. The device may either drive the car or be driven by it.

## C-86—Seat Cover Fabric

A fabric for automobile seat covers has been perfected and put in production by E. W. Twitchell, Inc., Phila., Pa., called "Super-fine" Textilene Sunsure material.

Claimed a balanced fabric because the pick both horizontal and vertical is more nearly equal in number than fabrics previously marketed, the balance is designed to make the material stronger and more flexible. Its high-gloss finish additionally makes the material smoother.

This smoother surface of the more tightly woven fabric virtuallly eliminates chance of static electricity shock, according to claim. New patterns consist of stripes, solids, plaids, and herringbones.

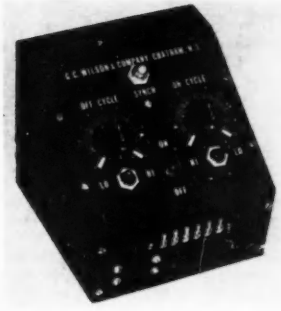
**NEW ★ PRODUCTS**

*For additional information please use coupon on page 58*

## C-87—Repeat Cycle Timer

A repeat cycle timer offered by G. C. Wilson & Co., Chatham, N. J., is an electronic device which employs one radio type vacuum tube and obtains its timing interval by the charging of two resistance-capacitance networks. One cycle initiates the next cycle without any moving parts or external operation. The OFF and ON cycles are infinitely variable and are substantially independent of one another. Claimed a highly stable timer, it is said to be only slightly affected by changes in line voltage, temperature, etc.

Power supply is 105-120 volts, 60



*Wilson repeat cycle timer, model 1*

cycles. (DC timers are also available). Time interval ON is 0.2 to 200 seconds; OFF is 0.1 to 60 seconds. These intervals are interchangeable. The DPDT contacts are each rated at 10 amp 115 volts, or 2 amp 460 volts, non-inductive. All contacts are wired to either Jones plug or terminal strip.

## C-88—Quick Exhaust Air Valve

An auxiliary air valve which enables cylinders to start their return stroke in a split second has been brought out by Ross Operating Valve Co., Detroit, Mich.

The fast timing is accomplished because the new unit, known as a quick exhaust or dumping valve, acts as a

*Ross quick exhaust air valve*

supplementary exhaust to the regular operating valve. When the latter is in open position and starts to exhaust, it automatically causes the self-operating dumping valve, which is mounted right at the cylinder, to "dump" the exhaust air thus permitting the cylinder to start its return trip almost instantaneously.

This provision is said to make the dumping valve ideal for close-coupling on machinery where quick cylinder return increases safety of operation and improves performance. It is also adapted for use on equipment where distance between the operating valve and cylinder tends to slow the exhaust and retard the speed of cylinder operation. The Ross quick-exhaust valve effectively offsets the distance factor since it releases the air right at the cylinder. The valve is available in $\frac{3}{8}$ in. through 1 in. pipe sizes.

## C-89—Redesigned Fork-Lift Truck

Redesigned Clark "Trucloader," 1000 lb capacity fork-lift truck of the Industrial Truck Division of Clark Equipment Co., Battle Creek, Mich. Truck features flowing lines and attachment of gas tank to rear of the frame so that it is partially enclosed by the counterweight. The counterweight has been redesigned to more rounded contour, additional weight providing added sta-

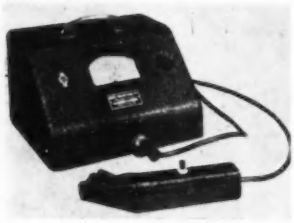
*Clark 1000 lb capacity fork-lift truck*

bility. Steering column has been moved forward to provide more leg room; and lift and tilt levers have been relocated in the same positions as on other Clark models.

## C-90—Electronic Surface Comparator

A new electronic comparator provides accurate surface control of machined parts as quickly and easily as routine dimensional checking, according to announcement by the Merz Engineering Co., Indianapolis, Ind. This Merz pico surface comparator checks surfaces electronically against an approved sample, and assures instant accurate meter readings. Compact, portable, complete, it can be used handily anywhere on the production line.

The Merz pico comparator consists of meter, exploring head and adapter. Readings are taken in 5 seconds by pressing the head against the surface being checked, touching the actuating



*Merz portable pico surface comparator*

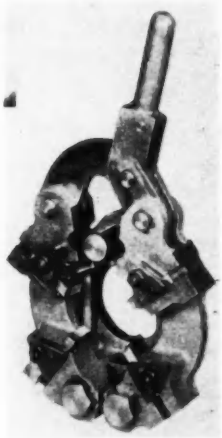
button and comparing the meter reading against the Master reading. A knife-edge meter pointer reads only one point on the scale, thus eliminating calculations or averaging. The area of exploration is said to be some 500,000 times greater than with tracer methods —and there is no diamond to scratch the work. The unit weighs approximately 15 lb, and operates from any 110-volt, 60-cycle outlet.

# NEW ★ PRODUCTS

*For additional information please use coupon on page 58*

## C-91—Quick-Opening Die Head

Overall time for threading pipes, bolts and solid rounds is substantially reduced with a new quick-opening die head brought out by the Peerless Machine Co., Racine, Wis. The head features monotype high speed steel chasers and can be used on any pipe threading machine having capacity to 2 in. pipe dia. The die head is quickly opened by means of a hand operated toggle clamp, permitting rapid removal of



*Peerless quick-opening die head for thread cutting on different pipe machines*

stock after threading. Closing the clamp brings the chasers to accurate and positive cutting position.

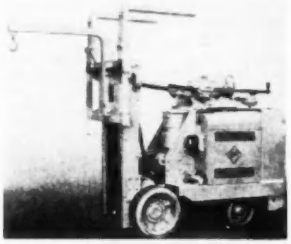
Adaptors are furnished with the die heads for mounting either vertically or horizontally on the machine carriage. Series of die heads designed for vertical mounting are interchangeable on individual machines. Sets designed for horizontal mounting are also interchangeable. Thus it is practical to have different die heads for various pipe and bolt diameters.

Die head components are machined iron castings providing ample backing metal for the hardened steel chasers—a feature preventing chatter during cutting. Individual or monotype chasers are held in place by hold down plates and stop screws.

A separate set of chasers is required for each thread pitch and each pipe dia. Die head adjusting screws permit chaser setting to cut oversized or undersized threads. Both right and left hand chasers are adapted to standard die holders. Single chasers are replaceable.

## C-92—Single-Unit Fork and Boom

An industrial truck attachment providing both fork and boom in one unit, built by Elwell-Parker Electric Co.,



*Elwell-Parker single-unit fork and boom attachment*

Cleveland, O., is useful in metal working and other plants where loads are heavy and vary in shape and size. The attachment also finds value where fork trucks have need for a rope or cable sling suspended from a boom. Additionally, both fork and boom can be used together for some jobs requiring extra security in handling.

The compound fork and boom unit comprises a base member attached to the truck's lifting mechanism which rides in the upright tilting columns; the fork tines suspended from a bar supported on this base; and the boom. The boom is a solid, alloy-steel heat-treated bar bent at right angles near the middle of its length. That part which engages the base is machined for a sliding fit into brackets and a base socket where it is held vertically and firmly in place.

When forks are to be used alone the boom is detached by slipping it out of its holder. When boom is required by itself the fork tines are swung upward and backward and held in this reversed position by means of pins in the brackets at top of the back-base. Tines clear truck mechanism at any working height.

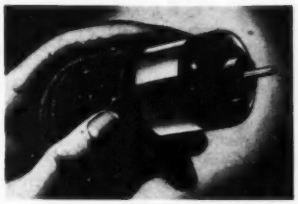
Boom in the model illustrated extends 36 in. horizontally from base. Fork tines are 36 in. long. Maximum height of lift of boom hook from floor is 30 to 145 in. Maximum height of fork is 117 in. Truck's rated capacity is 4000 lb.

(*Turn to page 74, please*)

# NEW Products for AIRCRAFT

For additional information please use coupon on page 52

## R-9—Sub-Miniature Electric Motor



*Holtzer-Cabot sub-miniature electric motor.*

Designed for aircraft instrument operation and receiving its current from the plate circuits of a sub-miniature vacuum tube amplifier, a direct current sub-miniature type servo motor weighing 8½ oz and delivering 1/500th hp is now being manufactured by Holtzer-Cabot, Inc., Boston, Mass.

Designated the RBDS-0810, it measures 1⅝ in. in dia and 2 9/16 in. between hubs, and operates on a field current of 6 milli amp, with a stalled armature current of .8 amp. It has an operating range from sea level to 40,000 ft altitude covering temperature variations from —65 F to + 160 F. Maximum speed of this minute high precision rotating mechanism is 14,000 rpm.

The motor has two independent high impedance field windings for reversible operation, hermetically sealed in metal. Armature is operated from a separate source of direct current, and in order to obtain maximum sensitivity compatible with reliable operation, the air gap between armature and field is extremely short.

As an example of one operating scheme, the two field windings are connected into the two plate circuits of a push-pull amplifier. When the two plate currents are in balance, the motor is at rest, but when the plate currents are unbalanced, the motor runs in a direction and at a speed depending upon the degree of unbalance.

## R-10—Flame-Resisting Oil Tank

*New type oil tank capable of withstanding fire and temperatures of 2000 F. developed for the United States Navy by The B. F. Goodrich Co., Akron, Ohio. The flame-resisting container, first of its kind, is also bullet-sealing for naval aviation uses. An outer coating, in which American-made rubber is combined with other materials, gives unusual resistance to heat and direct exposure to flame, greatly increasing the factor of safety of oil cells, particularly for installations in combat aircraft.*

## R-11—Tail Wheel Assembly

Development of a new automatic full-swivel steerable tail wheel assembly unit, specifically designed for Stinson and other four-place aircraft, has been announced by the Scott Aviation Corp. of Lancaster, N. Y. The 8-in. wheel assembly, with pneumatic tire, incorporates new provisions for automatic control while taxiing.

The unit, Scott model 3200, goes into

*Scott 8-in. tail wheel assembly for 4-place air craft*

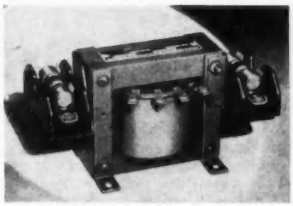
full swivel only when the pilot desires —by applying the brake to one wheel sufficiently to pivot the ship, forcing the assembly beyond rudder travel; or in the hangar by lightly pushing the tail sideways.

The company claims the tail wheel assembly gives positive taxiing control, far beyond rudder travel to allow for complete maneuverability either on the field or in the hangar.

## R-12—Altimeter With Dial Counter

The Kollsman "160" altimeter, a new sensitive altimeter with an altitude-counter on the dial, has just been designed and developed by the Square D Company's Kollsman Instrument Division, Elmhurst, N. Y.

Avoiding the confusion of reading multiple pointers, the Kollsman "160" altimeter has on its dial a single pointer and a two-digit counter similar to the automobile mileage-counter. The dial is graduated at 50 ft intervals and



*Square D altimeter with counter*

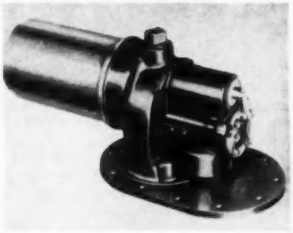
its single pointer makes one revolution per thousand feet. Each revolution is then registered on the counter which gives altitude in thousands of feet. For example, at 16,080 ft, altitude, the pilot would, at a glance, see the number 16 registered on the counter and simply add 80 indicated by the pointer. Dials graduated at 20 ft intervals will be made available for commercial use.

A new type of temperature compensation is utilized to insure accurate readings within the range of from 160 F to —60 F. Loss of accuracy, due to high G-loads during maneuvering at jet speed, is prevented by a novel method of balancing the acceleration force of half the aneroid cells against that of the other half, thereby eliminating the linkage and counter-weight formerly used.

## R-13—Water Injection Pump

New Series RD-8500 fully submerged pumps for aircraft anti-detonate injection, brought out by Lear, Inc., Romec Pump Co. Div., Elyria, Ohio, employ a viscosity-controlled fluid by-pass to prevent compression of air in the fuel system when the pump is operated on an empty tank. Anti-friction ma-

(*Turn to page* 70, *please*)



*Lear water injection pump, series RD-8500*

# AIRBRIEFS

By ROBERT McLARREN

## Airframe Profits

It is reassuring to report, for the first time since V-J Day, a general record of profit for the airframe manufacturing industry, as predicted in these pages a year ago. But the rates are small, lying in the 5 to 7 per cent bracket (in percentage of sales) and reflecting strongly the high proportion of military business with its stringent profit limitations. A cross-section of recent reports reads: North American Aviation, Inc., $6,779,561 (7 per cent); Lockheed Aircraft Corp., $6,239,380 (5 per cent); Douglas Aircraft Co., $5,829,206 (5 per cent); Republic Aviation Corp., $2,196,475 (4½ per cent); Grumman Aircraft Engineering Corp., $2,393,311 (6 per cent); Ryan Aeronautical Co., $356,603 (4½ per cent), etc.

Airframe profit figures indicate that profit percentage on gross sales tends to increase with increase in sales. This follows the general business trend but is more significant in its converse form, that is, profit percentage drops with sales volume. This results from the fixed charges accompanying the so-called "essential nucleus" of personnel and equipment. As sales drop to this level, profits drop to zero. It is now clear that the Air Force procurement program fell below this level in the preceding two or three years at the same time that the Air Force was insisting that this "essential nucleus" be maintained. Profitable operation of the industry during the past year indicates that all of its manifold ills can be cured simply by adequate military procurement, and that would appear to be available now and for the next few years.

## Nonskeds Doomed

What had earlier looked like a reprieve has turned out to be another rebuff for the nation's non-scheduled air carriers as Senator Edwin Johnson (D., Colo.), chairman, Senate Interstate and Foreign Commerce Committee, has held that the Civil Aeronautics Board is within its power to enforce more stringent regulations of nonsked operators. The hearing revealed that there are about 2000 nonsked airlines in business, of which 114 are classified as "large" and of which 12 to 24 would be virtually put out of business. The new regulation would require each operator to justify its claim for exemption from the regulation instead of the present blanket exemption. While CAB believes that only 12 to 24 would be severely affected, the National Independent Air Carriers, which represents the nonskeds, claims that the new order would eliminate the 60 principal nonsked operators and wipe out the three most lucrative routes: Puerto Rico-New York, transcontinental and the Seattle-Alaska routes. Basic reason for the CAB-Johnson antipathy is the high fatality rate for the nonskeds, which is 14 times as bad as the scheduled airlines in the last report available.

## Liquid JATO

Wartime development of the JATO (jet assisted take off) powder rocket motor proved a significant boon to heavily-loaded aircraft in hoisting them into the air from short runways, under high temperature conditions or at high-altitude airports. So simple and practical has the Aerojet JATO unit become that fittings for it are now virtually standard equipment on jet fighters, jet bombers, military transport planes and some commercial airlines in Central America. But the powder rocket has one big disadvantage: once you have pulled the pin it burns violently to exhaustion, there being no method of controlling either its rate or time of burning. Aerojet has now developed a liquid rocket JATO unit, however, which can be carefully controlled throughout its operation by fuel valves. This control permits its use in the air for high-speed acceleration and its use on the ground for accommodating variations in gross weight, ambient temperature, airport altitude, etc. The unit is self-contained and is simply bolted in place and cockpit controls are attached, the latter a permanent installation. But use of the new liquid unit requires more care than the powder unit since the former trails a long, hot tongue of flame that is absent from the latter.

## Getting Together

As any American citizen knows, we are nurtured on rugged individualism in this country and that applies to both our political and economic activities. Maybe we present a solid front on the major issues but if the problem is of anything less than national importance, then we just argue and do things our own individual way. This paradox is nowhere better expressed than in the aviation industry where virtually millions of dollars have been spent on "standardization," "joint proposals," "unified programs," etc. all to little if any avail. The only time any progress has been shown in this regard is when the government used the old "knock heads" approach to the problem. And that is why oldtimers are no more than amused at the current rash of "studies" of standard cargo containers, standard ground handling facilities, standard cargo or passenger "prototype" designs, etc., which sound like the 'twenties all over again.

We all readily admit that great savings can result from such joint agreements but when the time comes to sign we want our own product a little different than the next fellow's. The recent report of the Prototype Evaluation committee is a case in point for it contains the joint recommendations of the services, the industry and the operator, and no two of them agreed on a single point not actually covered by a government specification. Another case is the standard cargo container, which would fit an airplane, railway car, truck, farmer's fruit-picking dock, etc., with none of the interested parties agreeable as to size, humidity-control, etc. And now comes the scheduled airlines with a proposal for a maintenance standard to be used by the airframe industry in the design of new aircraft. The latter industry is ready to embrace this proposal with open arms—anytime *all* of the airlines will agree to all of the provisions of the standard. And the airframe industry is certain that will never be accomplished. So diverse are individual aeronautical requirements that some observers seriously question whether it would not be more economical to return to the prewar practice of individual design and production of such things as bolts and nuts in aircraft when all of the costs of current standardization programs are added up! Frankly we think this individualism is a healthy thing—for assuredly Russian aircraft builders have no problem of "getting together" on specifications—but look at their airplanes and airlines!

## Skycoach Era

After 20 years of furnishing a luxury service for the top tenth of the nation, the airlines are now rushing to embrace the remaining nine-tenths with "skycoach" service—which is flying without frills. By adding more seats, eliminating pretty stewardesses and abandoning meals aloft, the airlines are now offering air transportation that, in many cases, is less expensive than rail-plus-pullman service. But it took the non-scheduled airlines to scare the trunk lines into the new service. The $99 transcontinental fare created a land-office business for the nonskeds that made significant inroads into the luxury liner service. Now the scheduled airlines are offering service at that same price but with the added services of dependability, safety

(*Turn to page 76, please*)

# Inland Steel, too, Is Tailor-Made to *Your* Needs

● "Custom-tailored" is not a term which pertains only to fine-fitted clothing. It applies also to fine steel . . . *job*-fitted Inland steel. Being a completely integrated and independent producer, Inland is able to supply steel exactly suited to your specific requirements . . . and to act quickly when fast action is necessary. At Inland, your orders for steel—as well as your steel problems—are treated with friendly personal interest. *Your* steel is carefully checked and rechecked through each phase of production, to insure the quality and characteristics you desire.

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# OBSERVATIONS

By JOSEPH GESCHELIN

## Speed-Up Fallacy

In characteristic fashion unions continue to shout "speed-up" at every opportunity. When a manufacturer invests a considerable sum of money in a modern machine capable of greater productivity, does such equipment displace workers? The best answer to that is found in the figures available from the AMA or the NMTBA. They show that employment has risen in almost geometric progression over the years, particularly during the past 15 years when the most impressive strides have been made in technologic advances.

## Automatic Drives

For the first time an overall program of automatic transmission adoption now appears to be taking definite shape. Cadillac, Olds and Pontiac have the Hydra-Matic. It seems quite certain that Chevrolet will talk about its torque converter, possibly for 1950 models. Buick is justly proud of its Dynaflow and doubtless will announce it on the Special Series when that model is introduced later this year. Packard is very close to the announcement of its torque converter. Ford is reported to be about to take on the Hydra-Matic for its Lincoln cars. We hear too that Nash has plans for a special drive of its own. At least three of the other independents are known to be working with Borg-Warner divisions, probably Detroit Gear, on a new version of the three-element torque converter.

## Light Cars

As a portent of things to come, we hear that at least one prominent manufacturer is busy on the development of a light rear axle. This is doubtless intended to be available if and when motor car producers are ready with low priced, smaller models.

## Converter Castings

An ad in the Statistical Issue of AUTOMOTIVE INDUSTRIES pictured a torque converter element casting. It's of more than passing interest by way of showing the possibilities of aluminum sand castings of real intricacy. Incidentally, aluminum castings will be used in an automatic drive to be introduced soon.

## Heat Treat

Although martempering and austempering are not new techniques to the metallurgist, it is only recently that the full advantages of these methods have been exploited in mass production. Martempering, in particular, should emerge soon as a mass production application of major proportions. One manufacturer expects to revolutionize his method of heat treating cylinder sleeves by a completely mechanized martempering layout. We also learn that one of the major producers in the truck field intends to apply martempering with a mechanized cycle for many heat treating operations.

## Voids Glare

Although the sun visor for modern cars appeared to be just another accessory at the start, many owners swear by it, and some engineers recognize its virtue. One engineer told us recently he felt that the styling boys had gone too far with the rakish front. Certain it is that many drivers who spend a lot of time on the road find the visor a life saver when driving east before noon and going west after noon.

## Elmira Notes

A group of engineers in Elmira, N. Y., is reported to be working with a hydraulic drive for passenger cars, incorporating a high pressure fluid generator and fluid motors. Since several earlier attempts around Detroit failed to bear fruit, we assume the Elmira group has something more promising. Some cooling fan experiments also are underway in which the fan is run at constant speed. While the cooling effect is adequate, the relatively low speed effects a salutary reduction in the usual noise level and a corresponding reduction in the power required to drive the fan.

## SAE Panels

Nothing of its kind has stirred so much interest as did the Production Clinic in Detroit in March. And we are glad to have had important share in its evolution and planning. Apart from the value of production clinics to men who run plants and departments in the industry, the panel members got just as much out of it as did the audience. Panel members were extremely enthusiastic and anxious to serve again. These panels differ considerably from the usual technical meeting. There is a panel of recognized experts to be sure. But it was found that the audience included a generous sprinkling of equally well informed practitioners who contributed to the general discussion.

## War College

It was with considerable pride and pleasure that we addressed the Industrial College of the Armed Forces in Washington for the second year. More should be said about the splendid group of high ranking officers representing all branches of the military establishment who are selected for the course. The objective is to impart a better knowledge of industry—its composition, its problems, its facilities—to career men who must shoulder the responsibility for running the shore establishment in a national emergency.

## Port Holes

Buick may have started a trend with what has become popularly known as the three and four "holers," the port holes on the fender skirts of the new Supers and Roadmasters. Around Detroit recently—and we suppose in other parts of the USA also—1949 Fords and other new cars as well as many jalopies suddenly sprouted port holes in front. Surprisingly to us, they look good. They were installed by owners, particularly the younger set, and they do something to relieve the flatness of sheet metal at the front end.

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# PERSONALS

*Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.*

Pratt & Whitney Aircraft Div., United Aircraft Corp.—**Arthur E. Smith** has been named Chief Engineer. **Dr. John C. Mertz** has been named to the post of Materials Engineer, succeeding the late **Gordon T. Williams.**

Hyatt Bearings Div., General Motors Corp.—**Frank A. Weiss** has been made Asst. to the General Manager, **H. O. K. Meister. Leo V. Farrell,** formerly Asst. Purchasing Agent, has been promoted to the position of General Purchasing Agent.

General Motors Corp., Diesel Engine Div.—**Raymond E. Danto** has joined the sales staff to conduct customer research and market condition studies as related to the Series 71 Diesel engines.

General Motors Corp., New Devices Section—**Harry C. Dumville** has been made Director of the section.

Gisholt Machine Co.—**Clifford J. Baxter** has been appointed General Sales Manager. **Howard V. Myers** will succeed Mr. Baxter as the new District Manager of the Chicago office.

The Dow Chemical Co.—**William S. Loose** has been appointed Magnesium Div., Sales Manager.

Tinnerman Products, Inc.—**Charles E. Pearson** has been made Coordinator of Sales, Production and Engineering of the new Speed Grip Nut Retainer division of the company.

The Cleveland Pneumatic Tool Co.—The following officers have been elected to the posts indicated: **Vern R. Drum,** Vice-President; **John F. Wallace,** Vice-President; **E. W. Cleveland; Ogden Ashley, Treasurer; Lloyd R. Shivley,** Controller and **Melvin J. Balser,** Asst. Controller.

Ford Motor Co.—The announcement of the appointment of **Theodore O. Yntema** as Vice-President—Finance has been announced.

Ford Motor Co.—**Drew Holt** has been appointed Plant Supt. of the Parts and Equipment Div.; **John C. Waterman,** Materials Handling Engineer for the division; **Peter Lyshak,** Administrative Asst.; **Donald C. Carter,** Plant Mgr., Green Island, N. Y.; **W. G. Currier,** who has been acting plant manager, has resumed supervision of the maintenance and power departments at Green Island. **Frank Lynn** will serve as plant superintendent at Green Island.

Lincoln-Mercury Div., Ford Motor Co.—**Chris J. Fournier** has been appointed to the sales staff of the division. **John S. French** has been named Sales Manager of the fleet sales section, succeeding **S. M. Copland,** who has joined the staff of **I. L. Pierce,** Manager of the Service Department.

Lincoln-Mercury Div., Ford Motor Co.—The promotion of **N. E. Crews** as national used car manager, has been announced.

Chrysler Corp., Plymouth Div.—**Frank L. DeCavitte's** appointment as Factory Manager of the Plymouth plant at Detroit has been announced. **George H. Rumford, Jr.,** now superintendent of the Evansville plant, becomes plant manager, succeeding Mr. DeCavitte.

General Motors Corp.—Appointment of **Donald G. Morse** as director of General Motors Employe Suggestion Plan Section has been announced.

Budd Company—The following promotions have been announced. **Robert W. Desing,** named Asst. Director of Industrial Relations; **Harper Adams,** appointed Personnel Manager at the Hunting Park plant and **Elwood Stirling** has been named Asst. Personnel Manager.

Irving Air Chute Co., Inc.—**William H. Schwinger,** Vice-President and Treasurer of the Company and **Harold G. Rogers,** Vice-President in Charge of Sales, were elected directors.

Pennsylvania Salt Mfg. Co.—The appointment of **Nicholas M. Walker** to the Packaging and Labeling Div. has been announced.

American Society of Tool Engineers—**Robert B. Douglas,** Montreal, has been elected President.

Snyder Tool & Engineering Co.—**Leo P. Gajda** has been promoted from the position of Chief Draftsman to Director of Engineering.

Thomas A. Edison, Inc., Instrument Div.—**Arthur A. Blue** has been appointed Manager of the Division.

Standard-Thomson Corp.—**C. W. MacNeill** will direct a new chemical and metallurgical laboratory being established.

The Hy-Pro Tool Co.—The announcement has been made of the promotion of **Robert A. Smith** to the position of Sales Manager.

Fairmont Tool & Forging, Inc.—**Donald E. Lewis** has been elected Vice-President and General Sales Manager.

American Steel & Wire Co.—**Ronald E. Griffiths** has been appointed assistant Director of Research.

Aviation Maintenance Corp.—The new General Works Manager for the company is **George E. Lam. James W. Roche** is in charge of quality control.

American Society of Tool Engineers—**Roger F. Waindle,** General Manager of the Industrial Products Div., Elgin National Watch Co., has been elected to the Board of Directors.

Davis Motorcar Co.—**Stanley E. Billington** has resigned as General Sales Manager.

Lear, Inc.—Three new directors have been elected to the company board—**Harold R. Boyer, Thomas M. Belshe** and **O. C. Hall.**

American Brake Shoe Co.—The appointment of **Donald K. Rennie** as superintendent of the Winchester, Va., plant has been announced.

Evans Products Co.—The appointment of **T. J. Manning,** formerly Vice-President of Howell Electric Motors, as Assistant to the President of Evans Products has been announced.

## Necrology

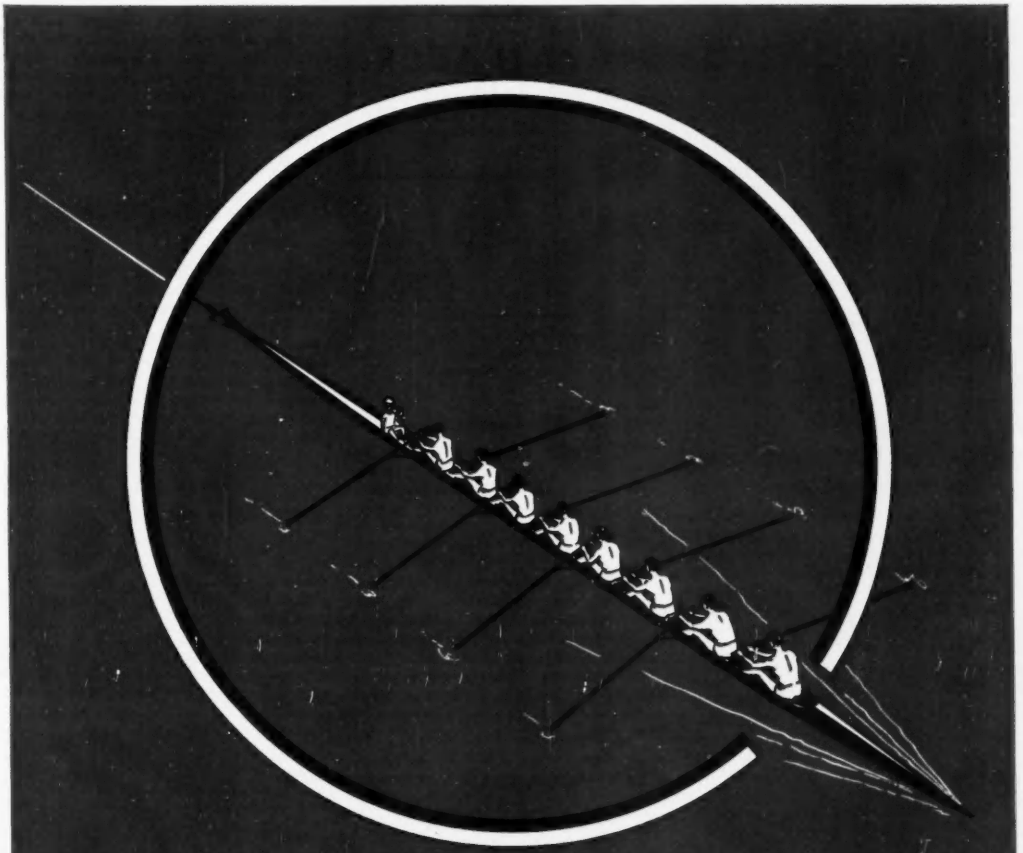
**Ernest Moross,** 75, formerly with the management of the Indianapolis Motor Speedway and pioneer automobile racing promoter and racing driver manager died on April 4 in Long Beach, Calif.

**Joseph H. Tracy,** 76, former assistant chief engineer The Electric Storage Battery Co., Philadelphia, died suddenly on March 15, while enroute from Florida to his home at Jenkintown, Pa.

**Cleveland Norcross,** 37, general manager of the American Institute of Physics, died March 21 in New York City.

**Clifton Slusser,** 56, vice-president, The Goodyear Tire & Rubber Co., died on March 25 in Akron, Ohio.

**McMillan Robinson,** 38, sales manager for the Metal Products Div. of Koppers Co., Inc., died in Philadelphia, on April 4.



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# PUBLICATIONS AVAILABLE

**Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.**

## A-113—Casting Operations

Monarch Aluminum Mfg. Co.—Cavalcade of Casting Experience is the title of a new 16-page booklet which explains the three casting operations offered by the company. The booklet contains tables of alloy properties and illustrates and explains Monarch's aluminum permanent mold, aluminum and zinc die casting operations.

## A-114—Sound Film on Man-Au-Trol Horizontal Lathe

The Bullard Company—a 16 mm sound film showing the Bullard 30-H Man-Au-Trol Horizontal Lathe is available for authorized industrial group showings. The film is titled Three For One. Two other Bullard films, the Man-Au-Trol Vertical Turret Lathe film entitled Master of the Machine, and the Spacer film, Bullard Pioneers Interchangeability without Jigs, are available. Address inquiries to The Bullard Company, Bridgeport 2, Connecticut.

## A-115—Gages

The Sheffield Corp.—An attractive new 116-page catalog of fixed gages has been announced. It is a well illustrated handbook of factual and useful information for the buyers and users of perishable gages and includes prices, complete specifications, diagrams and tables. It is described as a combination catalog, price list, textbook and reference manual.

## A-116—Reflectogage

The Sperry Products, Inc.—Bulletin No. 3700 describes the Reflectogage, a portable, ultrasonic treatment for measuring thickness of materials from one side only. The bulletin describes the theory and general application of the instrument to non-destructive measurements of plate and sheet stock, tanks, boilers, pipe, extruded shapes, etc. Interpretation of the visual ultrasonic indications is also described and illustrated. Other uses of the Reflectogage described in the bulletin are tests for lack of bond, lamination and internal defects of sheet stock.

## A-117—Pyrometers

The Bristol Co.—A new bulletin on Bristol Diesel Engine Pyrometers has been issued. The 12-page bulletin, P.1239, describes and illustrates with photographs and dimensional drawings, approved Navy and commercial type Diesel engine pyrometers and thermocouples suitable for use on all types of Diesel engines.

## A-118—Stamping Dies and Tools

Advance Die & Tool Co.—A new 8-page bulletin entitled Simplify Your Production with Advance Tooling, illustrates a variety of large and complex stampings produced from Advance dies and tools. Also described and shown are the complete facilities and equipment of the company, including its engineering department, machine tool room, etc.

## A-119—Synchro-Start Controls

Synchro-Start Products, Inc.—Catalog No. 4, on Synchro-Start automatic controls for gasoline and Diesel engines, has been issued. The catalog shows the user how to select controls for specific applications, how to install them and how to service them. Among the types of controls described are: full automatic control sets, automatic starting control sets, automatic cranking controls, power failure starting, automatic temperature starting control system, safety stop and alarm, safety stop controls, overspeed governors, solenoids, relays, auxiliary engine

(*Turn to page* 60, *please*)

***TIME SAVER COUPON** for your convenience in obtaining, WITHOUT OBLIGATION, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.*

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# Sealing cover plates that position internal parts

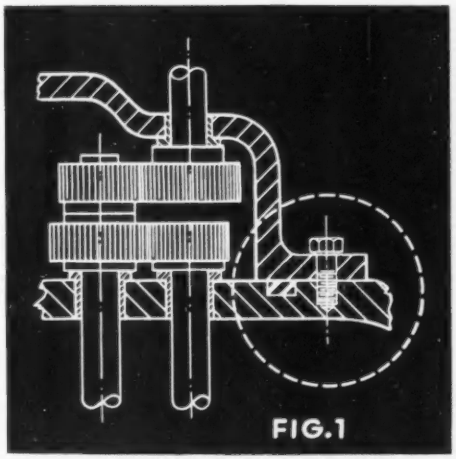
FIG.1

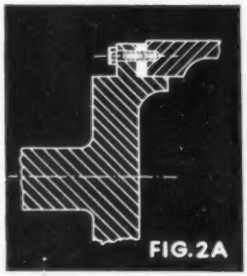
FIG.2A

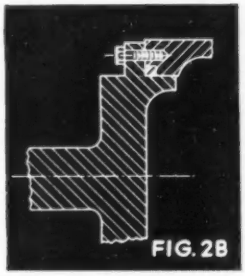
FIG.2B

Where a removable cover plate positions internal parts, a metal-to-metal joint provides positive alignment and rigidity.

The most practical sealing material for metal-to-metal joints is one that is truly compressible. Truly compressible gaskets do not side flow under pressure. They deflect only in the direction of the applied load. Hence they won't extrude and interfere with correct mating of the flanges.

Typical of truly compressible materials, Armstrong's DC-100 Cork-and-Neoprene will compress up to 33% without appreciable side flow. And with most fluids, its resistance is equal to straight Neoprene.

Used to seal the flange in figure 1, DC-100 replaced a flat paper gasket. Variations in paper thickness had caused misalignment of internal parts. The confined cork-rubber gasket insures positive alignment and provides a lasting, oiltight seal.

The flanged journal of a calender roll was sealed by a flat rubber gasket as in figure 2a. Each time worn journals were replaced, however, lack of parallelism made a costly grinding operation necessary.

The journal, modified in figure 2b, permits quick, on-the-job replacement with positive alignment. The cork-and-rubber gasket seals coolants and compresses to permit perfect mating of the flanges.

Armstrong's cork-and-rubber is made with natural or synthetic rubber to obtain the desired solvent resistance. By adding calculated amounts of compressible cork to these non-compressible rubbers, Armstrong produces compounds in which side flow is controlled within specified limits.

Versatile cork and rubber may help solve your sealing problems. We suggest that you discuss your application with an Armstrong representative. He can suggest suitable materials and supply samples for experimental use.

## Send for this gasket handbook

You'll find useful application and specification data in the new, enlarged 24-page booklet, "Armstrong's Gasket and Sealing Materials." It contains up-to-date data on synthetic rubber, cork-and-synthetic-rubber, cork composition, and fiber sheet sealing materials.

This booklet includes ten technical discussions of the factors influencing modern gasket and joint design. It also suggests methods of putting Armstrong's stock materials to specialized uses in such fields as radio, electrical, automotive, petroleum, and transportation industries. Also included are typical applications and current government specifications.

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## A-120—Pre-Plated Metals

American Nickeloid Co.—A handy index to the company's wide selection of pre-plated metals is contained in the new Nickeloid Metal Sampler and File Folder. The die-cut Sampler, a 4-page, letter-size folder, contains samples of Nickeloid metals finished in Chrome, Copper, Nickel and Brass. In addition to actual samples in bright and satin finishes, striped and crimp designs, complete data is given on the sizes of sheets, coils and flat strips available.

## A-121—Cork Products

Korfund Co., Inc.—Typical installations in which cork may be satisfactorily used to control transmission of vibration and noise, installation data, and information on specification writing are given in a new illustrated bulletin, C-1. Five convenient forms are listed and their construction described.

## A-122—Die Heads

The Eastern Machine Screw Corp.—Bulletin No. 14A describes the company's Style DM Insert Chaser Die Head for Brown and Sharpe Automatic Screw Machines. Construction information is given, together with tables of dimensions, capacities and carrier ranges.

## A-123—Bronze Bearings

Bound Brook Oil-Less Bearing Co.—A new 16-page booklet, Stock List No. 3, listing the hundreds of sizes and types of COMPO oil-retaining porous bronze bearings carried in stock, is available. Additional data on bearing formulae, tolerances, loads and specifications makes this a complete reference book for engineers, designers, purchasing agents and operating maintenance executives.

## A-124—Roller Chains

Atlas Chain & Manufacturing Co.—A new 12-page catalog, Atlas Roller Chain, describes new features for safety, wear and maintenance found in Atlas Chain, and gives operating characteristics. Photo-micrographs, engineering drawings and component photographs illustrate construction from complete assembled chain down to metallurgical characterstics. Specifications and prices for most sizes of American Standard Roller Chain—and attachments—are also included.

## A-125—Stainless Castings

The Cooper Alloy Foundry Co.—Announcement has been made of the publication of a new house organ, Newscast. It is devoted exclusively to the task of providing information about the uses and properties of stainless steel castings. Application stories depicting how Cooper Alloy castings serve in industry as well as detailed technical data, is included in the first issue now available.

## A-126—Low Pressure Cylinders

Hanna Engineering Works—Catalog No. 236, a new 20-page book, on Hanna Low Pressure Cylinders, includes dimensional drawings, construction features and capacities of all standard sizes and gives information on mounting brackets, cylinder cushions, etc., as well as cylinder selection data.

## A-127—Control Instruments

Potter Instrument Co., Inc.—A new 4-page condensed catalog issued by the company is a brief guide to its complete line of High Speed Electronic Counters, Scalers, Counter Chronographs and special electronic frequency measuring and computing equipment. In addition to the description of the available standard counters, a discussion of the electronic counting principle, methods of count detection and typical applications is included.

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# BOOKS ...

COMBUSTION ENGINES, by *Arthur P. Fraas*, pub., *McGraw-Hill Book Co.*, 430 pp., set of five charts in separate packet. Latest addition to the literature on internal combustion engines, this text, intended for engineering students and young engineers, covers gasoline and Diesel engines and includes material on gas turbines as well. The author is Associate in Motors, Aeronautical Institute of Technology, of Brazil, and was formerly connected with the Case Institute of Technology. Use of the text presupposes a knowledge of thermodynamics, chemistry and physics. Unlike other books in this field, this one deals entirely with latest theory related to methods for solving practical problems and does not touch on mechanics or engine part design. Briefly, the text covers such matters as idealized cycles, thermodynamic calculations, combustion, ignition, cycle analysis, fuel metering and injection, intake and exhaust manifolds, cooling, lubrication, supercharging, gas turbines, engine installations, etc. Since most attention has been given to automotive engines because of their economic importance, the book should prove of greatest benefit to students interested in the automotive field.

1948 A.S.T.M. STANDARDS ON PETROLEUM PRODUCTS AND LUBRICANTS (with related information). This November, 1948 compilation covering Standards on Petroleum Products and Lubricants, with considerable other related information, published by the American Society for Testing Materials, is the most extensive special compilation the Society has ever issued. Covering some 760 pages it gives, with few exceptions, all of the large number of test methods and the special other standards developed by Committee D-2 on Petroleum Products and Lubricants. The exceptions not included in this compilation are the methods of tests for knock rating of engine fuels which are published in a *Knock Test Manual* issued earlier in 1948, with an appendix scheduled for publication early this year which will bring the Manual up-to-date.

There are large groups of standards (over 145) covering motor and aviation fuels; Diesel and burner fuels, kerosene and illuminating oils; lubricating oils; greases; plant spray oils and petroleum sulfonates; electrical insulating oils; light hydrocarbons; hydrocarbon solvents; asphaltic materials; crude petroleum; and thermometers.

Several appendices add to the value of this new compilation, and in addition to the Annual Report of Committee D-2, the following proposed methods are given; performance characteristics of wheel bearing grease; separation of residue from butadiene; butadiene dimer in polymerization grade butadiene; nonvolatile residue of polymerization grade butadienesodium in lubricating oils and lubricating oil additives; measuring the temperature of petroleum and petroleum products; analysis of calcium and barium petroleum sulfonates; and benzene and toluene by means of ultraviolet spectrophotometry. Also given are proposed factors and tables for volume correction and specific gravity conversion of liquefied petroleum gases; optional use of detonation meter for motor and research methods; and a proposed method of test for sulfur in petroleum oils by quartz tube combustion.

Copies of this 760-page book in heavy paper cover can be procured from A.S.T.M. Headquarters, 1916 Race St., Philadelphia 3, Pa., at $5.50 each; in cloth, $6.15.

INDUSTRY WIDE BARGAINING by *Leo Wolman*, professor of economics at Columbia University, published by the *Foundation for Economic Education, Irvington-on-Hudson, N. Y.* Industry-wide bargaining creates powerful exploiting monopolies by combining labor unions with employer associations, according to the author. In making this assertion he characterizes this ever-increasing process as one of the most pressing American problems.

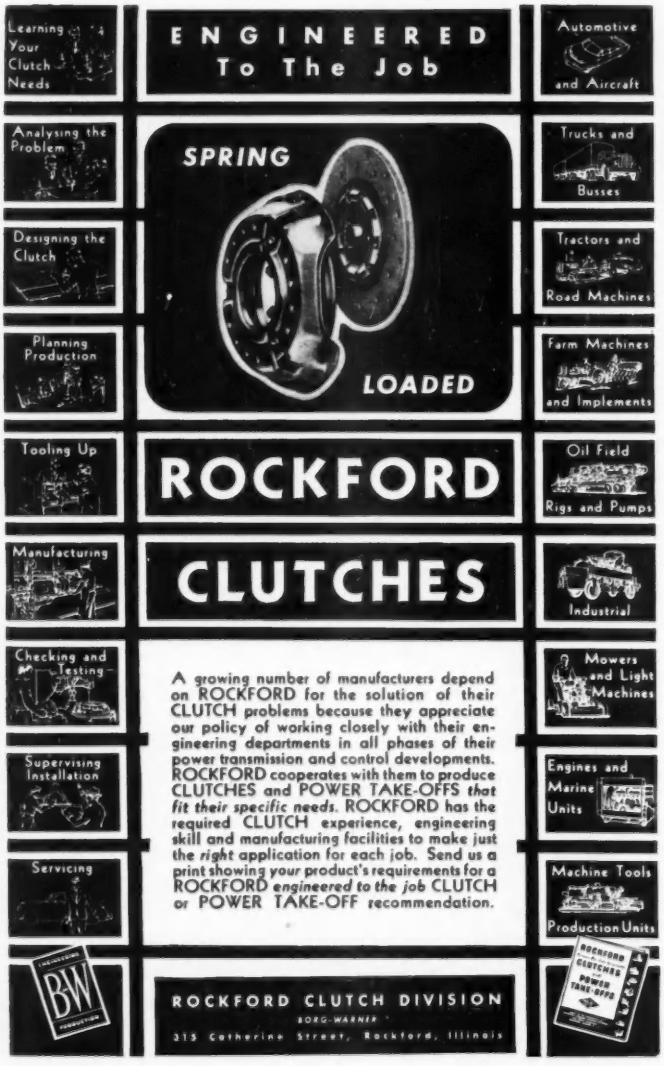
Because industry-wide labor concessions can be transferred readily into industry-wide price increases, Wolman points out that the employer-union relations become substantially collusive arrangements in which competition declines and the customer suffers.

Like all monopolies, those in labor resist adjustment to changing conditions. Wolman declares that the monopolistic economic policy which seems to protect certain standards of prices, wages, or work rules, may well add instability to the business structure. When an employer cannot adjust costs in unstable times, he must close shop or reduce his labor force. When this happens on a large scale, the result is mass unemployment and depression.

Wolman considers as a formidable task the elimination of such evils of monopoly practice which threaten the American economy. As the most effective means, he recommends the removal of special privileges granted organized labor by government. "The problem cannot be dealt with effectively unless, and until, organized labor's immunity to the anti-trust laws is withdrawn."

The book is priced at 50¢ per single copy, five copies for $2.00, 10 copies for $3.75, or 50 copies for $17.50.

(*Turn to page 64, please*)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# BOOKS ...

(Continued from page 62)

AUTOMOBILE CHASSIS DESIGN, by *R. Dean-Averns*, published by *Iliffe & Sons, Ltd.*, London. This book is designed as a text for the study of the fundamentals and technique involved in the design of an automobile. Much of the subject matter is primarily concerned with heavy-vehicle design but, being of a general character, it is applicable also to the field of lighter car design.

Subjects covered include: vehicle performance, front axles and suspension, vehicle braking and performance, the frame, chassis springs, the transmission, rear axles, the differential, and the chassis.

AUTOMOTIVE FUNDAMENTALS, by *Irving Frazee* and *Earl L. Bedell*, published by the *American Technical Society*. This book was written for anyone who desires an understanding of how automotive vehicles work and what can or does happen to them. The automotive vehicles covered by this volume include all land surface vehicles that carry their own source of energy and can be steered.

The book is divided into two parts to separate principles from their application to vehicles. *Part One* covers fundamentals of the science involved and provides a basic knowledge of how scientific principles are applied to the original design and maintenance of motor vehicles. *Part Two* presents the principles of operation of the vehicle as a whole and of each of the component units or systems.

The price of *Automotive Fundimentals* is $4.90.

JET PROPULSION—TURBOJETS, by *Volney C. Finch*, published by the *National Press, Millbrae, Calif.* This book presents a clear picture of jet propulsion for everyone interested in aviation. It provides a technical treatment of the history of development of the gas turbine followed by recently released data concerning the practical application of aero-thermodynamics to analysis, design, and operation of turbojets. Two hundred illustrations enable the reader to visualize the applications.

A large amount of unclassified technical information on aircraft gas turbine power plants has recently been made available, and it is upon this knowledge that the book is built. The material has been condensed and arranged in logical sequence. Frequent use of graphical methods is made for the solution of typical problems. List price of *Jet Propulsion—Turbojets* is $5.50.

DICTIONARY OF GUIDED MISSILE TERMS, published by *Public Affairs Press*, 2153 Florida Ave., Washington 8, D. C.

This dictionary, prepared by the Committee on Guided Missiles of the Research and Development Board of the National Military Establishment and published with the cooperation of the Coast Artillery Association, provides definitions of technical terms and jargon used in the guided missile field. It defines such unique expressions as bang-bang, back-scattering, downwash, balladromic, beeper, mach number, loran, schlieren, scopodromic, entropy, servo-system, dihedral, and emmisivity.

Moreover, many everyday words are taking on all sorts of special meanings. It defines "sting" as a mount for a model in a wind tunnel, "canard" as a type of aircraft with control surfaces in front of the wings, "meadow" as a range of air-fuel ratio that produces smooth combustion, "drag" as the component of the total air forces on a body, "glint" as a pulse variation affecting radar, "lobe," as one of the three-dimensional portions of the radiation pattern of a directional antenna.

The dictionary is available at $1 per cardboard bound copy and $2 per cloth bound copy.

SYMPOSIUM ON FUNCTIONAL TESTS FOR BALL BEARING GREASES. The five papers and numerous discussions in this Symposium on Functional Tests for Ball Bearing Greases were presented at the Fifty-first A.S.T.M. Annual Meeting. The Symposium was sponsored by Technical Committee G on Lubricating Grease of Committee D-2 on Petroleum Products and Lubricants.

Many makers and users of grease have recognized the need for suitable test methods, and have made separate efforts to develop them, with resulting divergencies in apparatus and procedure. The aim of the symposium was to assemble information collected by outstanding investigators and laboratories on the functional methods used for testing greases and the significance they attribute to the results.

The authors representing a variety of interests include: a grease manufacturer, a machinery manufacturer, an industrial user of greases, an association of aircraft manufacturers, and a military user of greases. The discussers also are drawn from the different interests of this field. The entire symposium presents a balanced picture of the present status of functional testing of ball-bearing greases.

The following papers are published in this Symposium: *Development of Functional Grease Methods for the Aircraft Industry*—D. H. Moreton, Douglas Aircraft Corp.; *Grease—An Oil Storehouse for Bearings*—D. F. Wilcock and Marshall Anderson, General Electric Co.; *Laboratory Performance Tests for Anti-Friction Bearing Greases*—M. Herlot, W. A. Prendergast, R. W. Barnett, W. J. Finn, and O. P. Puryear, The Texas Co.; *Service Experience with Grease*—W. T. Everitt and C. L. Pope, Eastman Kodak Co.; and *Factors Affecting Simulated Service Tests of Greases*—Sidney M. Collegeman and John R. Belt, U. S. Naval Engineering Experiment Station.

Copies of this 104-page publication, in heavy paper cover, can be procured from A.S.T.M. Headquarters, 1916 Race St., Philadelphia 3, Pa., at $1.75 per copy.


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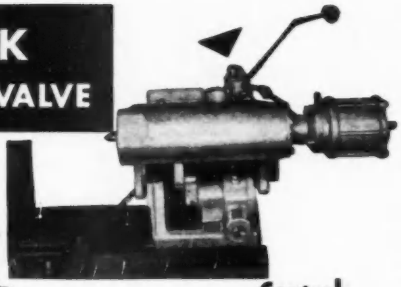
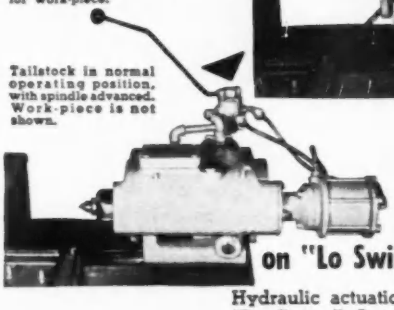


Tailstock in raised position at end of work cycle to provide easy clearance for work-piece.

Tailstock in normal operating position, with spindle advanced. Work-piece is not shown.



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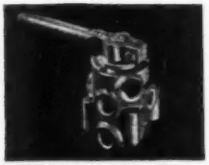

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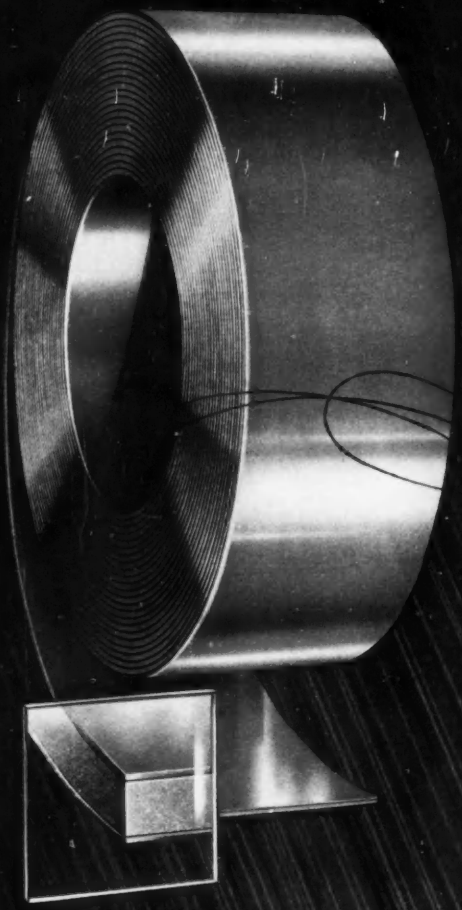

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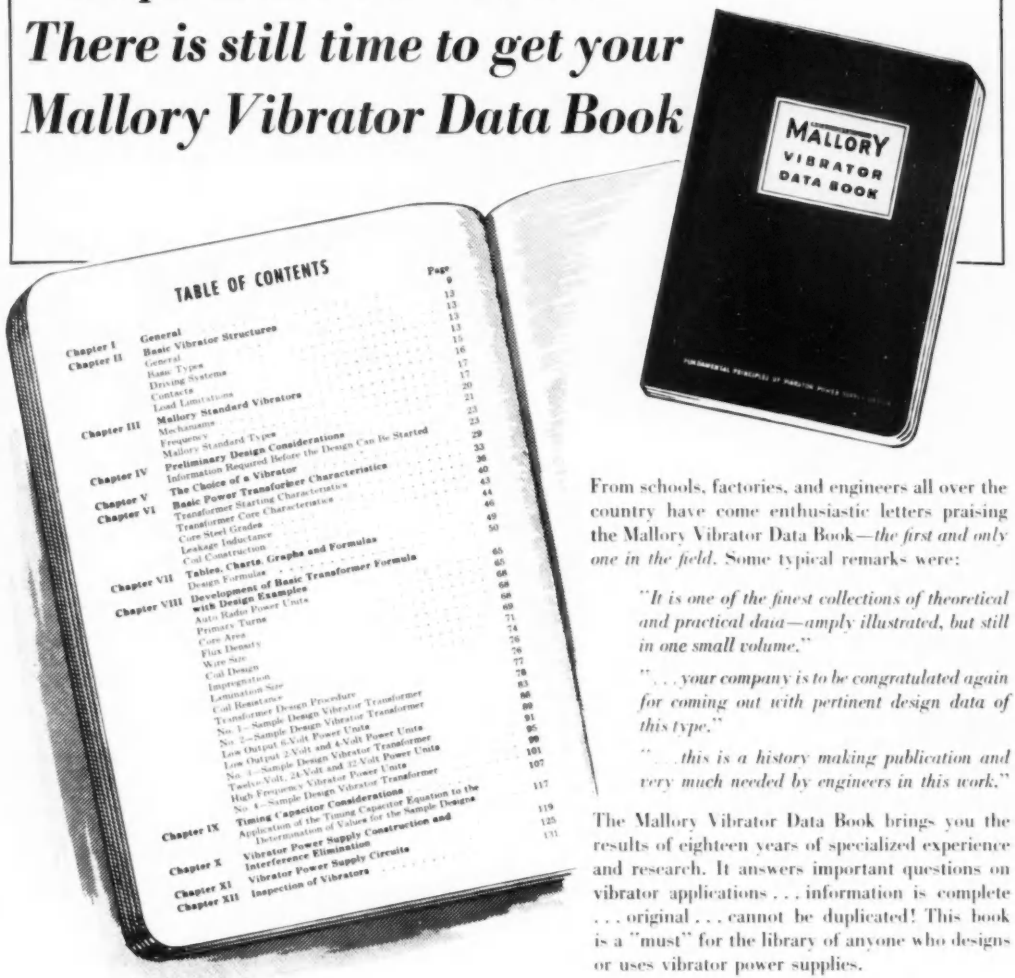
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VIBRATOR
DATA BOOK
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## Business in Brief

**Written by the Guaranty Trust Co., New York, Exclusively for AUTOMOTIVE INDUSTRIES.**

Business activity in general declined during the week ended March 19, reversing the trend shown in the week before. Electric power production, crude oil output, and bituminous coal production were lower than in the preceding week, and railway freight loadings were substantially reduced, while steel production was steadily maintained, and paperboard production advanced. The *New York Times* index of activity for the week ended March 19 stands at 143.7, as compared with 147.0 in the preceding week and 147.9 a year ago.

Sales of department stores during the week ended March 26, as reported by the Federal Reserve Board, equaled 278 per cent of the 1935-39 average, as compared with 261 in the week before. Sales were 16 per cent below the corresponding distribution a year ago, the same percentage variation as that registered in the preceding week. The total in 1949 so far reported is 6 per cent less than the comparable sum in 1948.

Railway freight loadings during the week ended March 26 totaled 396,329 cars, 1.9 per cent less than the figure for the week before and 10.1 per cent below the corresponding number recorded in 1948.

Crude oil production in the same week averaged 5,130,450 bbl daily, 14,950 bbl less than in the preceding week and 246,800 bbl below the comparable output in 1948.

Production of bituminous coal and lignite during the week ended March 19 is estimated at 2,870,000 net tons, 72 per cent less than the output in the week before, and 17.4 per cent below the corresponding quantity in 1948. The sharp drop in output reflected the so-called "holiday" of Eastern miners.

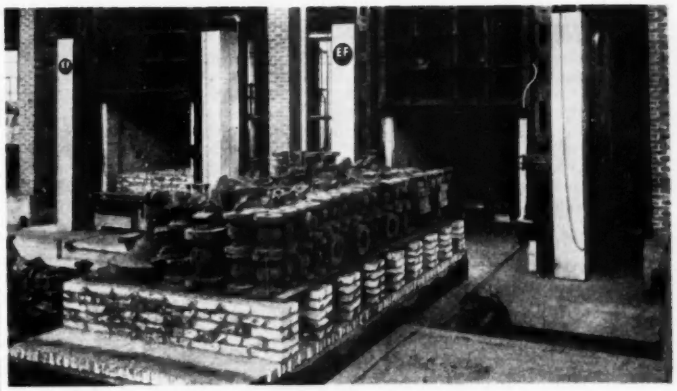
Civil engineering construction volume reported for the week ended March 31, according to *Engineering News-Record*, was $132,174,000, or 27 per cent less than the preceding weekly figure and 39 per cent below the comparable sum in 1948. The total recorded for 13 weeks of this year was 23 per cent more than the corresponding amount in 1948. Private construction for the last week of March was 38 per cent below that a year ago, and public construction showed a comparable decline of 43 per cent.

The wholesale price index of the Bureau of Labor Statistics during the week ended March 22, at 158.2 per cent of the 1926 average, was 0.2 per cent less than in the preceding week and 2.6 per cent below the corresponding figure in 1948. Reduced prices of textiles and building materials were held to be major factors in the decline of the general index.

Member bank reserve balances declined $341 million during the week ended March 30. Underlying changes thus reflected include an increase of $246 million in Treasury deposits with Federal Reserve banks and a decrease of $134 million in Reserve bank credit, accompanied by a decline of $20 million in money in circulation.

Total loans and investments of reporting member banks declined $610 million during the week ended March 23. A decline of $133 million in commercial, industrial, and agricultural loans was recorded. The sum of these business loans, $14,962 million, shows a net increase of $391 million in 12 months.


EF BATCH TYPE



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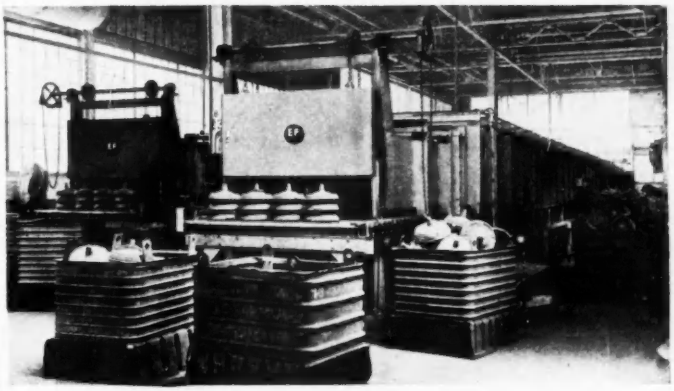

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# Farm Machinery Market Continues Strong

(*Continued from page* 33)

Seven of the larger firms within the industry of this country produce about 60 to 65 per cent of the total agricultural equipment output, according to the Department of Commerce. These generally concentrate on manufacture of equipment used in the growing and harvesting of the so-called major crops.

This leaves the field wide open to some 1600 smaller firms for the production of general types of farm equipment. Like their bigger counterparts, some specialize in certain types of machinery and others produce only special purpose lines such as sprayers. Still a third group confines its activities to manufacture of parts.

Although the need is softening for several types of equipment, the overall market is still strong. Low wartime production and postwar strikes, plus a huge postwar foreign need, combined to build up a broad demand. Still another strong factor has been a postwar record high farm income.

Despite cries from many farmers that the high cost of equipment is sending them to the poorhouse, no less an authority than the Commerce Department says that their costs for equipment haven't risen either as fast or as high proportionately as their income. Farmers now have the buying power to not only replace obsolete and worn-out machinery but to buy new and improved equipment which they previously could not afford. Also, buying of more labor saving machinery has been forced upon them by a strong industrial labor market which, to some extent, has lured the farmhands by offers of higher wages and shorter hours. The Government's price support program guarantees this relatively good buying position to the farmer.

After a survey of the industry, the Office of Domestic Commerce summarizes its findings in regard to the major items in more critical supply about as follows:

Wheel Tractors—Production during 1948 is estimated at about 529,000 units of which all but 93,000 were sold to domestic users. About 24,000 more were imported to help meet domestic needs. Overall 1949 production will remain about the present level, with a probable shift in tractor sizes. Small 1-plow types have caught up with demand and larger 1-plow and 2-plow sizes are rapidly doing so. There is a continued shortage of the 3-plow and larger types.

Track-laying Tractors—Demand is seen as continuing strong for this type, particularly in view of heavy foreign demand which absorbed more than a quarter of nearly 40,000 manufactured last year. Only about a third of current production goes into farm use but indications are that foreign demand could still take all present American production.

Combines — Demand and supply should nearly balance by the end of the year if 1948 production of 90,000 units is equaled. Biggest need is for larger sizes. Exports of 11,850 compared with imports of 10,300 units.

Corn Pickers—Despite price drops in commodity markets, demand for these machines remains strong because of the cost and scarcity of farm labor. Production schedules indicate a larger output than last year when 80,000 units were made. Demand is still greater than supply.

Pick-up Balers and Side-delivery Rakes—The latter are necessary to operation of the baler, a relatively new development. Production of neither has been able to keep up with demand but backlog orders should disappear during 1949.

Tractor Plows and Cultivators—Supply has lagged, largely because of lack of pig iron for plow moldboards and spring steel for the cultivators. With more pig iron and steel in sight, supply should catch up with demand in early 1950.

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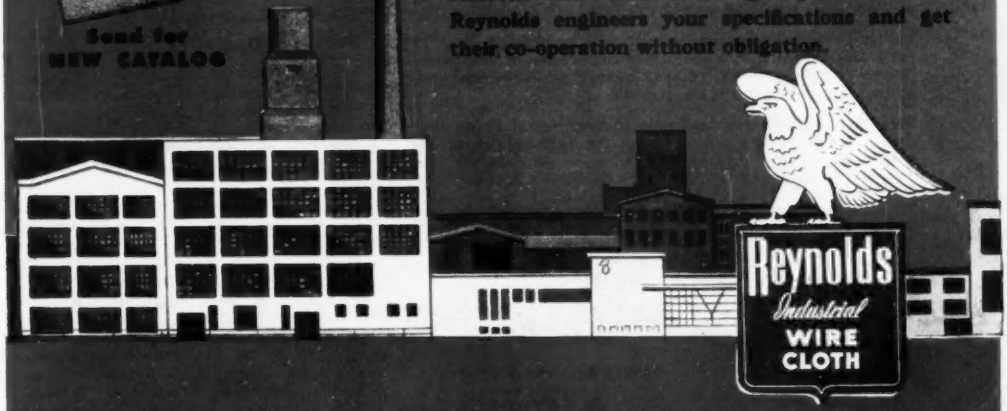


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(*Continued from page* 51)

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Parker's research department, with the knowledge and experience of a third of a century in the science of fine metal finishing, has formulated a line of cleaners whose benefits and advantages carry beyond the rinse-off.

Parco Cleaners remove the grease and soil—and act to condition the metal for the next step in the finishing operation. Now you can select a cleaner that helps you get economy and uniform, high-quality results with your finish.

Try a *harder-working* cleaner on your metal finishing line. Let us help you determine the Parco Cleaner that's right for you.

**GET FULL INFORMATION!**

Write for technical bulletin detailing properties of each Parco Cleaner.

*Bonderite, Parco, Parco Lubrite—Reg. U. S. Pat. Off.*

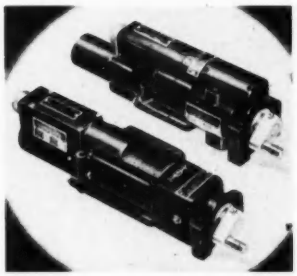
Parker

PARKER RUST PROOF COMPANY
2178 East Milwaukee Ave.
Detroit 11, Michigan

**BONDERIZING Holds Paint to Metal . . . PARKERIZING Inhibits Rust . . . PARCO LUBRIZING Retards Wear on Friction Surfaces**


## R-14—Trim Tab Control Units

An improved method for electrical operation of control surface trim tabs on latest aircraft is provided in the Trim Trol units of Airborne Accessories Corp., Hillside, N. J. The new models incorporate a pre-loaded balanced torque final drive to obtain zero



*Airborne 1949 model Trim-Trol electrical Trim Tab control units*

backlash of the output shaft to prevent tab flutter. A specially designed electrically powered rotary actuator is connected to the tab with a single link.

Selection of a crank arm which requires operation of the actuator through a total angle of from 120 to 160 deg to achieve full tab motion results in a mechanical advantage increasing proportionally with tab deflection. This minimizes the effort required as the load increases, and permits handling high operating and static loads with less power than normallly. Installation of the operating unit in the leading edge of the control surface permits most of its weight to serve as mass balance.

## R-15—Approved Drain Valve

A new type Air Force-approved drain valve for fuel tanks, radiators and other uses in aircraft, automotive, marine and industrial applications has been developed and is now being manufactured by the Charles E. Chapin Co., East Rutherford, N. J. Feature of the valve is its quick, positive action—a quarter turn is all that is required to open or close it.

The valve consists of a simple plunger located within a cylinder. When in closed position, a strong spring keeps a sealing ring tightly pressed against the shoulders of the cylinder. To open the valve, the plunger is pushed in against the spring tension and turned a quarter of a turn where it locks in open position. Liquid drains through four orifices into the hollow stem of the plunger. Made of brass and cadmium plated, the valve is available in quarter inch pipe size.

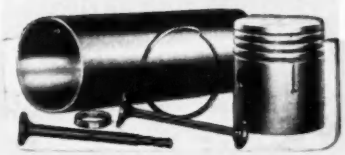
# This Thompson STEEL-BELTED design CONTROLS EXPANSION of aluminum pistons

**A** Steel Belt is cast in piston skirt, yet remains free of surrounding metal. Under engine heat, aluminum slides around steel belt, causing slot **B** to contract slightly. Steel Belt accurately controls expansion, maintaining proper piston circumference at the top of the skirt.

SIMPLE DESIGN

GREAT STRENGTH

*Thompson improvements in precision parts engineering include Steel-Belted Pistons, U-Flex Oil Control Rings, Cylinder Sleeves, Valve Seat Inserts, Sodium-Cooled Valves, Valve Rotocaps.*



**THE THOMPSON STEEL-BELTED PISTON MAKES IT POSSIBLE TO FIT ALUMINUM PISTONS CLOSER WITHOUT DANGER OF SCORING OR STICKING**

THIS ALUMINUM PISTON has a cast-in steel belt girdling its entire circumference for thermal expansion control under all operating temperatures.

SIMPLICITY OF DESIGN RESULTS IN GREAT STRENGTH, GOOD HEAT DISSIPATION, LESS OIL CONSUMPTION, SMOOTHER PERFORMANCE.

Thompson Steel-Belted Pistons proved their efficiency and long life under gruelling conditions of military service. Now they are available as original equipment for cars, trucks, buses, tractors and light aircraft. Several well-known engine builders have adopted this piston, and others have it in test.

If you wish further information regarding Thompson Steel-Belted Pistons, we will provide additional data and work with you in running tests.

**Thompson Products**

CLEVELAND • DETROIT • LOS ANGELES • ST. CATHARINES, ONTARIO

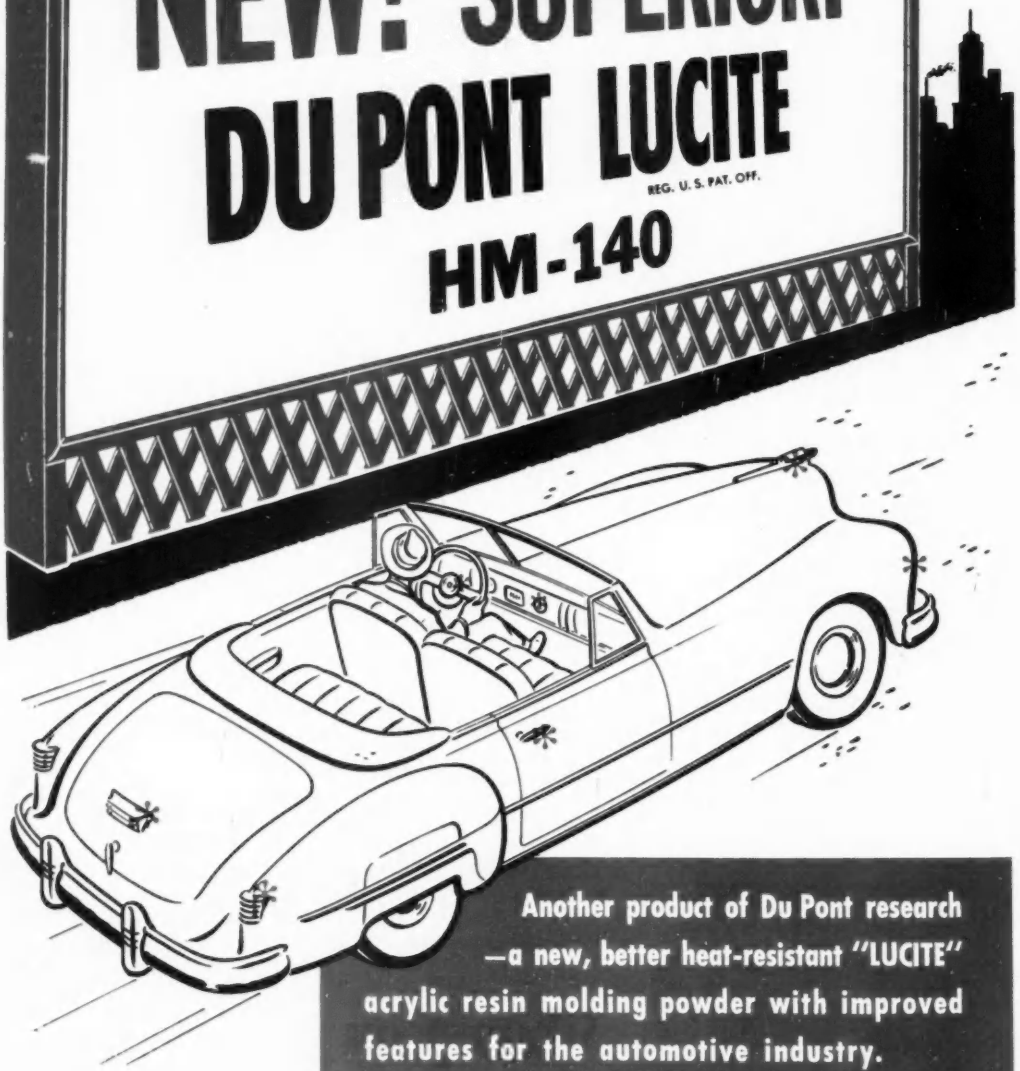
*Introducing:*

# NEW! SUPERIOR!

# DU PONT LUCITE

REG. U. S. PAT. OFF.

## HM-140



**Another product of Du Pont research —a new, better heat-resistant "LUCITE" acrylic resin molding powder with improved features for the automotive industry.**

## *New "Lucite" HM-140 offers these improved features*

**for horn buttons... for hood ornaments... for instrument dials... for lamp lenses... for reflectors... for medallions**

**IMPROVED MOLDING PROPERTIES**

Du Pont now offers a heat-resistant "Lucite" composition that can be molded as readily as general-purpose acrylics. In many instances, this means shorter molding cycles, less shrinkage of the molded piece, and a considerable reduction in rejects.

**BETTER COLOR**

In its crystal-clear form, the new composition is even more water-white than well-known "Lucite" HM-122. And its color is more stable at higher molding temperatures and on exposure to outdoor weathering. Now you can obtain a plastic part even more brilliant and lustrous than before.

## OF SPECIAL INTEREST TO MOLDERS AND DESIGNERS OF MOLDED PARTS—

New "Lucite" HM-140 is much more heat-stable than "Lucite" HM-122, which has been widely used in the automotive industry. For thin or intricate sections, *higher* molding temperatures can be used to attain the greatest degree of fluidity possible—without chemical breakdown. Because of its better flow properties, it can be molded into thick sections at *lower* temperatures. These features provide a wider molding range and improved molded parts.

## New "Lucite" HM-140 fits right into your "Micro-Styling"* plans

"Lucite" HM-140 with its luxurious beauty... its wide range of long-lasting colors... its rugged durability... is ideal for those little things that impress the style-conscious customer. "Lucite" has given outstanding performance in a wide range of automotive applications since 1937. The improved features of this new Du Pont plastic mean that hood ornaments, horn buttons, lenses, dial faces—all of the accessories included in Micro-Styling—can now be even more practical and attractive when made of "Lucite."

* **Micro-Styling:** *the design of small but important automobile accessories for beauty and utility too.*

**Write for further information** on "Lucite" HM-140 and other Du Pont plastics. No obligation. If you wish, Du Pont technical men will be glad to consult with you in confidence and advise on applications of Du Pont plastics to help your design and engineering plans. Write to the Plastics Department, E. I. du Pont de Nemours & Co. (Inc.), at the most convenient address: General Motors Bldg., Detroit 2, Mich.; Empire State Bldg., New York 1, N. Y.; 7 S. Dearborn St., Chicago 3, Ill.

*Tune in—Du Pont's famous "Cavalcade of America"—Monday night, NBC coast to coast!*

DU PONT
REG. U. S. PAT. OFF.
*Plastics*
BETTER THINGS FOR BETTER LIVING
*. . . THROUGH CHEMISTRY*

# NEW PRODUCTS

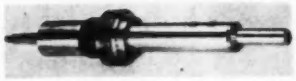
*For additional information please use coupon on page 58*

(*Continued from page 50*)

## C-93—Automatic Recessing Tool

The Maxwell Co., Bedford, Ohio, announces development and production of a new large-size automatic recessing tool designed especially for use on radial drills, boring mills and large boring machines as well as drill presses. The tool employs the same standard Max-WELL rack and gear operating mechanism used in smaller tools of the same line. This large size recessing tool can be used in conjunction with comparatively heavy machines to recess internal forms normally considered inaccessible for standard equipment.

A ball bearing loaded pilot feature permits use of the new tool in conjunction with existing fixtures. If fixtures are not used, tool collar will stop on the workpiece surface to accurately locate the cutters and the subsequent recesses. Cutter bits can be positioned to meet individual specifications, and with this new tool, cutters can be located for cutting deep recesses in relation to the work-



*Maxwell large-size automatic recessing tool*

piece outer surface. The tool may be supported either at the far end of the workpiece or in the bore itself.

Cutter feeds can be furnished in a ratio of approximately 1:3 as compared to the spindle speed. Individual cutters can be made of either high-speed steel or carbide tipped.

## C-94—Vertical Air Discharge Units

Young Radiator Co. of Racine, Wis., and Mattoon, Ill., reports an addition to their line of water and oil cooling equipment consisting of four vertical air discharge models, called the HC units. The units feature horizontal coils mounted above the fans (each two coils requiring one fan). The same two-coil unit can be employed for cooling both oil and water.

Radiator type cores for water cooling or round tube cores for oil cooling are standard equipment with all HC units. (Coils for steam and vapor condensing and for gas cooling are also available). Cooling air is blown upward through the coils; vertical discharge eliminates loss of cooling capacity which may result from cross wind effects.

*Young HC horizontal coil vertical air discharge unit*

The four new HC units require 2, 4, 6 and 8 coils respectively. Multiples of the units can be placed side-by-side, affording installation and piping in series. Water cooling capacities for the units range from 300,000 B.t.u. per hour for the smallest or HC-55 unit, to 4,320,000 B.t.u. per hour for the largest, or HC-520 unit. Oil cooling capacities range from 99,000 B.t.u. for the HC-55 to 1,570,000 for the HC-520.

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means . . . built to the exacting standards
which have made the name BORG & BECK
famous for 36 years!
You can depend on-
BORG & BECK
FOR THAT VITAL SPOT WHERE POWER TAKES HOLD OF THE LOAD!
BORG & BECK DIVISION
BORG-WARNER CORPORATION
CHICAGO 38, ILLINOIS

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# OUR OWN MEDICINE

For a long time we've been prescribing modern mechanical equipment as the most effective means of cutting production costs while turning out better, more useful, more saleable merchandise.

The traveling housing, open side milling and boring machine in this picture—the largest machine of its kind—was recently installed in the Clearing plant at a cost exceeding a quarter-million dollars. With it, we save manhours while maintaining the extreme precision which, in turn, enables you to cut your costs when you use Clearing presses.

We take our own medicine because we believe no industry can succeed under today's conditions if it clings to yesterday's methods and machines. If you are producing metal products in quantity, we can show you some interesting facts that may help you improve your competitive position. Why not ask us?

**CLEARING MACHINE CORPORATION**
6499 West 65th Street • Chicago 38, Illinois

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THE WAY TO EFFICIENT MASS PRODUCTION

# Over 100,000 of Kester flux-core Solder Types and Sizes Available

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POSITIVE FLUX UNIFORMITY

Kester Flux-Core Solders are made with a single core in several core sizes ranging from an opening that contains ½ of 1% to 7% of flux by weight. These core sizes are available in each of 68 strand sizes. Use of the correct size assures you of absolute soldering control. Consult our Technical Department on any soldering problem.

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*"SOLDER and Soldering Technique." A complete analysis of the properties and application of soft solder alloys and soldering fluxes. Get your copy now.*

1899 50th Anniversary 1949

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KESTER SOLDER


# CALENDAR

**Conventions and Meetings**

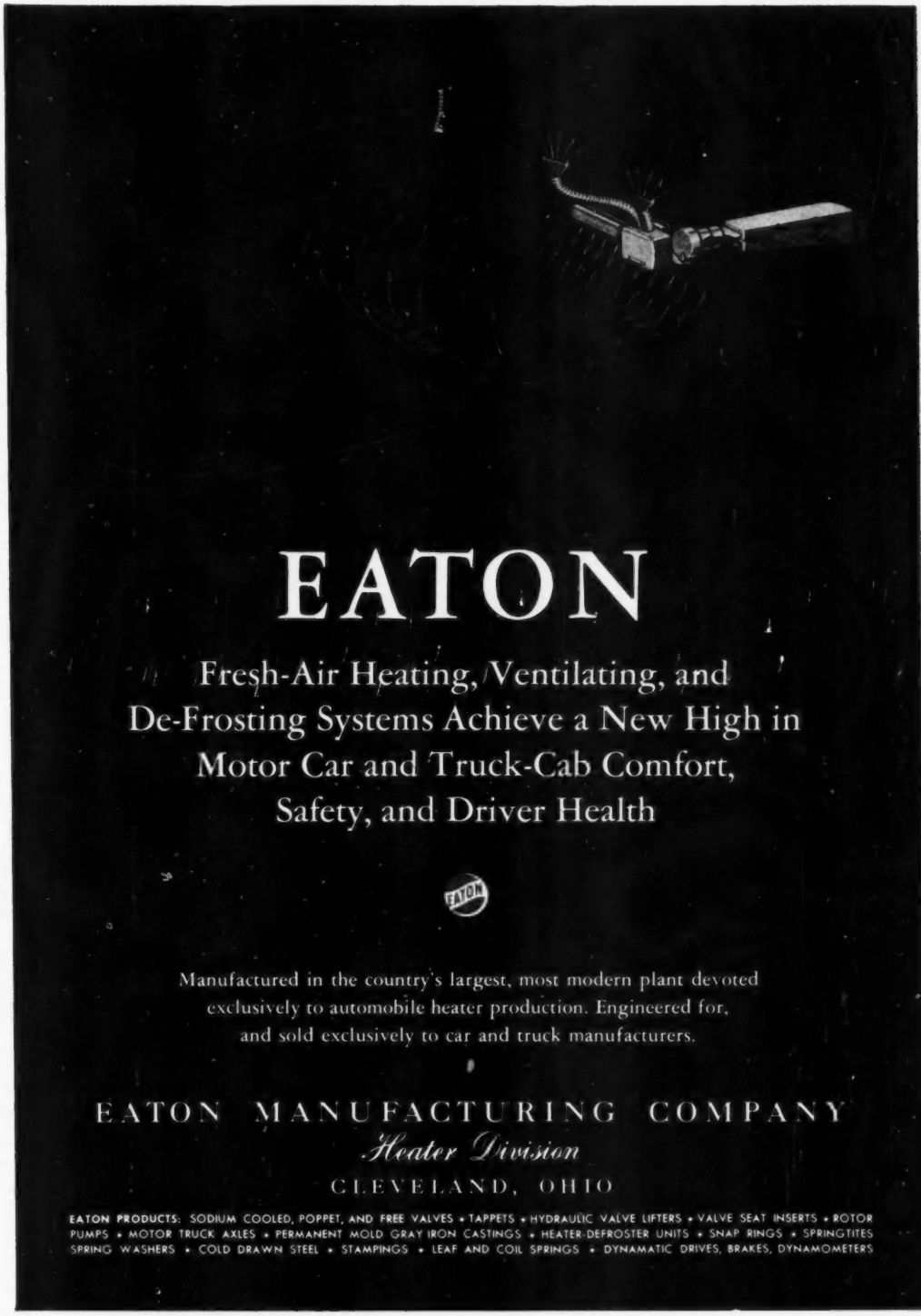
Amer. Soc. of Metals, Western Metal Congress, Los Angeles ..... April 11-16
Midwest Power Conference, Annual Meeting, Chicago ..... April 18-20
Magnesium Association Annual Meeting, Chicago ..... April 19-20
Machine Tool Electrification Forum (Westinghouse), Buffalo .. April 26-27
Salon International DeL' Aeronautique, Paris ..... April 29-May 15
Automobile Old Timers Annual Luncheon, New York City..... April 28
Chamber of Commerce of the United States Annual Mtg., Washington ..... May 2-5
British Industries Fair, London.. May 2-13
Amer. Soc. for Quality Control, Boston ..... May 5-6
Natl. Std. Parts Assn., Regional Business Mtg., Atlanta ..... May 9
Amer. Management Assoc. Nat'l Packaging Exp., Atlantic City ..... May 10-13
Instrument Soc. of America, Annual Mtg., Toronto, Can. ..... May 12-13
Soc. for Experimental Stress Analysis Mtg., Detroit ..... May 19-21
Auto. Eng. Rebuilders Assoc. Annual Convention, Baltimore, Md. ..... May 19-21
Paris Fair, Paris, France ...May 21-June 6
Natl. Std. Parts Assn., Regional Business Mtg., Philadelphia ..... May 22
Middle Atlantic Regional Automotive Show, Phila. ..... May 23-30
Canadian Int. Fair, Toronto, May 30-June 10
SAE Summer Mtg., French Lick June 5-10
Phila. Auto Trade Assoc. Show, Phila. ..... June 11-18
American Inst. of Elec. Engineers, Swampscott, Mass. ..... June 20-24
Amer. Soc. for Testing Materials Annual Mtg., Atlantic City..June 27-July 1
Amer. Electroplater's Soc. Annual Convention, Milwaukee ... June 27-30
SAE West Coast Mtg., Portland..Aug. 15-17
Canadian Nat'l Aircraft Exhibition, Toronto ..... Aug. 26-Sept. 10
Instrument Soc. of America Convention, St. Louis ..... Sept. 12-16
Inst. of Traffic Engineers, Washington, D. C. ..... Sept. 25-28
Society of Industrial Packaging and Materials Handling Engineers Annual Exposition, Detroit ... Oct. 4-7
Chicago Auto Show, Chicago .....Nov. 4-12

# AIRBRIEFS

(*Continued from page 52*)

and reliability. The CAB is encouraging this new trend in the conviction that added business will more than compensate for the reduced fares, which are generally on a 4c per mile basis. But the latest development in the battle is Pan American's proposal to load 111 passengers into its new Boeing Stratocruisers (luxury accommodations for 80) and offer trans-Atlantic fares as low as $225 one-way, $405 roundtrip!

With airlines already carrying one-third of the trans-Atlantic passenger traffic, and having actually brought more people *into* the U. S. than the steamships, we can stand by for a genuine battle royal when the steamship operators wake up to the facts. But there appears little question that air travel is assured of the No. 1 spot over rail, bus, and ship in the foreseeable future. And that, assuredly, will mean the long-hailed *air age* will be here in fact!



# EATON

## Fresh-Air Heating, Ventilating, and De-Frosting Systems Achieve a New High in Motor Car and Truck-Cab Comfort, Safety, and Driver Health

Manufactured in the country's largest, most modern plant devoted exclusively to automobile heater production. Engineered for, and sold exclusively to car and truck manufacturers.

EATON MANUFACTURING COMPANY

*Heater Division*

CLEVELAND, OHIO

EATON PRODUCTS: SODIUM COOLED, POPPET, AND FREE VALVES • TAPPETS • HYDRAULIC VALVE LIFTERS • VALVE SEAT INSERTS • ROTOR PUMPS • MOTOR TRUCK AXLES • PERMANENT MOLD GRAY IRON CASTINGS • HEATER-DEFROSTER UNITS • SNAP RINGS • SPRINGTITES SPRING WASHERS • COLD DRAWN STEEL • STAMPINGS • LEAF AND COIL SPRINGS • DYNAMATIC DRIVES, BRAKES, DYNAMOMETERS

# Industrial Development in America

*By Benjamin F. Fairless*
President, U. S. Steel Corp.

INDUSTRIAL development in America has not been one-sided or confined to narrow channels. Improvement and invention in one sector have promoted equivalent progress and invention in others. This interplay between and among the industries has been not only most interesting to observe, but it has been a dynamic force making for progress in all of them. The American economic system does not run to narrow specialization nor to the encouragement of an unbalanced one-industry country.

It seems but yesterday that the firing in the great Global War ceased and our tense American industry looked forward to an interlude in which it might take stock of the current situation, breathe, and reconvert its facilities. But the hope of turning to a less exacting pace soon faded and the thought of a substantial breathing spell was shown to be futile. Civilian demands poured in and the race was on again. Industry was not swamped and the system did not break down. In the face of shortages of skilled manpower and necessary supplies, shortages existing because everyone was trying to buy and build and to do everything at once, production records greatly outstripped those of former peacetime years, and in instances equalled or surpassed those of wartime vintage.

This was no mean accomplishment, we hold, and there are those who are of similar mind, even though their instantaneous specifications were not met in full. Be it said emphatically that in this situation industry did not seek to diminish production at any point, at any time, and that the philosophy of scarcity is not one of its guiding principles. Its responsible leaders know that, particularly in times of monetary inflation, one of the most effective counter irritants is an abundant flow of goods—and industry certainly has nothing to gain from inflation.

American industry as a whole has been spending large sums of money, billions of dollars annually since the war, for rehabilitation and expansion of its plants. In view of what has actually been encountered, we are unable to see that more could have been done than has been done, regardless of the size of the original objective or plan. We recognize that a heavy responsibility rests upon steel because it is a basic commodity, the essential ingredient of so many activities.

During the recent war, the capacity of the American steel industry for producing ingots and castings was increased from approximately 81,000,000 net tons to a peak of 95,500,000 in 1945. When hostilities had ceased and all critical requirements had been met, the over-due retirement of obsolete and badly worn equipment was initiated. At about the same time, a vast program of rehabilitation and expansion was undertaken. In this interim of tearing down and building up, the operable steelmaking capacity dropped by several millions of tons. On January 1 of this year, however, by the exercise of every resource known to the industry, the steelmaking capacity of the country stood at 96,000,000 net tons, an all-time high. Plans currently under way should increase this figure to 98,000,000 tons by the end of the year 1950.

Collateral problems of great concern to those who operate the steel industry accompany this very important development. For example, to feed the larger capacities, additional ore deposits must be developed, the transportation prob-

(*Turn to page 82, please*)

Another
Limiting
Factor
SWEPT
AWAY
by DOLE
Accepted by MANUFACTURERS OF PASSENGER AUTO AND TRUCK
D. V.—1
Know These Features:
Full seating pressure for quick warm-up
Powerful spring to control high pump pressure
Positive-acting, accurate thermal element for most efficient performance in atmospheric and sealed cooling systems.
Old ideas were scrapped when Dole DV Thermostats were developed. Entirely new in basic principles and construction, they satisfy the strictest requirements of modern engines. With Dole DV's the designer finds it possible to use smaller radiators, higher pump pressure, high set pressure caps and increase efficiency of pumps. Dole DV's are a practical answer to today's design needs. Four types give broad coverage of engine specifications.
DOLE DV THERMOSTATS
CONTROL WITH DOLE
THE DOLE VALVE COMPANY • 1901-1941 Carroll Avenue, Chicago 12, Illinois
Philadelphia • Detroit • Los Angeles

# DUREX-100 ENGINE BEARINGS DO THE JOB

It takes really durable engine bearings to carry the load in today's high speed engines. Extraordinary properties of conformability, embedability, resistance to corrosion and fatigue cracking are required to do a satisfactory job.

By sintering an intermediate layer of copper-nickel powders to a steel back and *then* casting a thin overlay of a special corrosion-resistant high lead babbitt *onto* and *into* this porous matrix, Moraine engineers produced a bearing that's more than equal to the task on hand—the rugged Durex-100 engine bearing.

The Durex-100 has proved itself as original equipment in Buick, Cadillac, Oldsmobile, GMC Trucks, and other automobile and truck engines, both gasoline and Diesel, for many years.

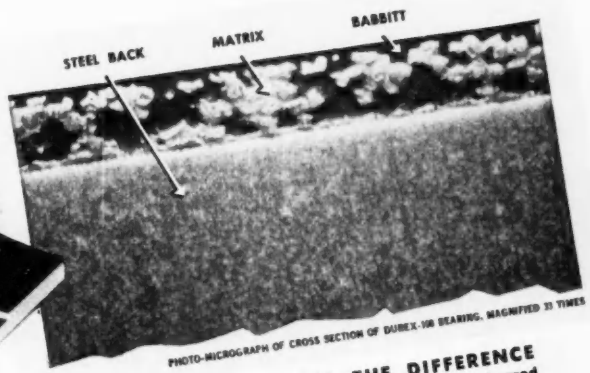


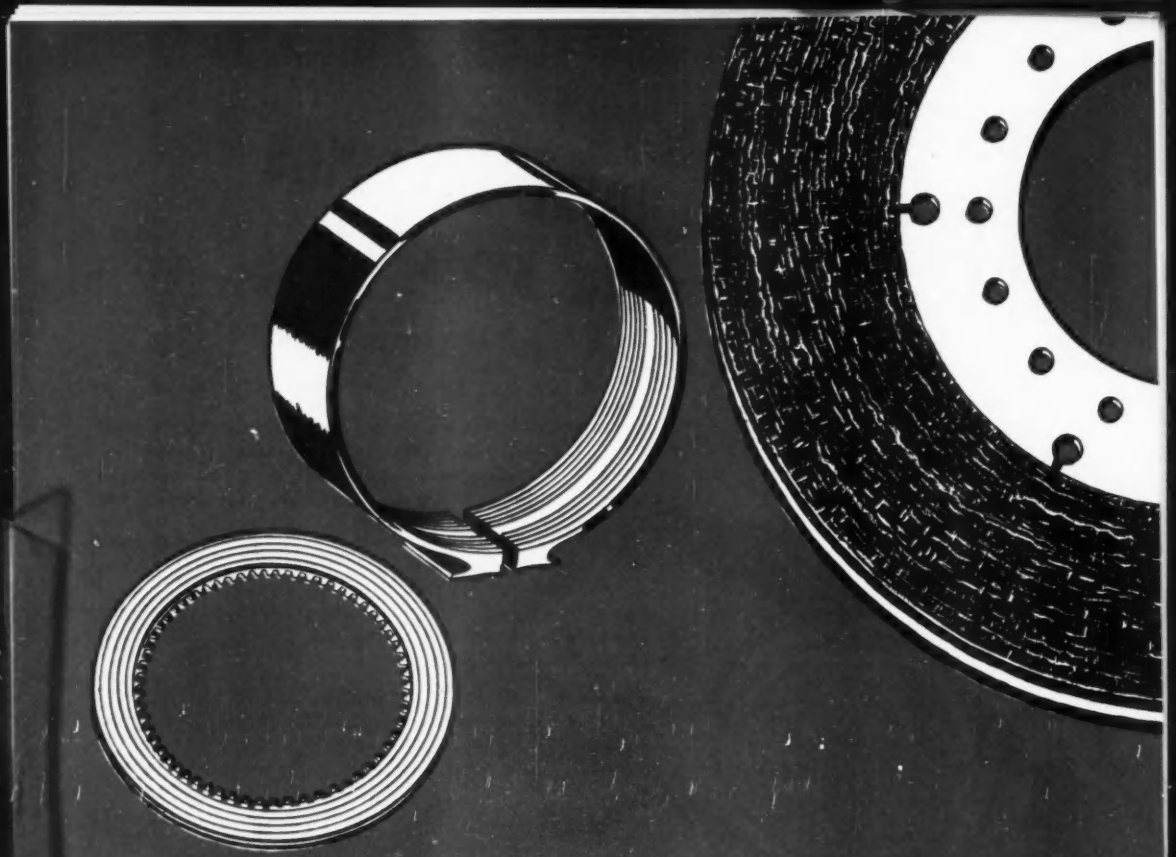

PHOTO-MICROGRAPH OF CROSS SECTION OF DUREX-100 BEARING. MAGNIFIED 33 TIMES

**THE MATRIX MAKES THE DIFFERENCE**
An intermediate matrix of porous copper-nickel is brazed to steel backing. This matrix bonds mechanically, as well as metallurgically, with thin high lead babbitt overlay.

## MORAINE PRODUCTS DIVISION OF GENERAL MOTORS

**DAYTON, OHIO**

**DUREX-100 ENGINE BEARINGS . . . BY MORAINE**



# HOW TO SAVE A BIG STEP ON SUB-ASSEMBLY LINES

Whatever your problems in brake or clutch assembly, you'll find the R/M representative a good man to consult. In many cases, he is able to make suggestions that save steps and save time in assembly operations.

Here's an interesting example. Where specifications call for a friction material bonded to a metal backing . . . a development with which you may not yet be familiar . . . R/M can supply the *completed* sub-assembly, finished to your special needs. You thus eliminate a purchasing operation, as well as several steps in fabrication and assembly!

If it is more practical for you to provide your own backing plate for bonding to the friction component, R/M will, without cost, provide manpower for instruction in the bonding process. The "know-how" is yours for the asking!

For further information, check with your R/M representative. At his call, ready to serve you, are four plants, four research staffs, and four complete testing laboratories . . . with a half-century's experience in brake and clutch applications.

## RAYBESTOS-MANHATTAN, INC.

**EQUIPMENT SALES DIVISION** **620 Fisher Bldg., Detroit 2, Mich.**

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RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings Fan Belts • Radiator Hose • Mechanical Rubber Products • Rubber Covered Equipment • Packings Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

RM

FIRST IN FRICTION

lems must be met with augmented equipment on land and water, new mines for the production of coking coal are required, and someone must find, somewhere, an adequate supply of steel-making scrap, a necessary commodity which has been in short supply for more than three years.

Whatever the course of events may be, the steel industry is determined to do its full share in meeting the needs of the country.

In the atmosphere of freedom which bred opportunity, it is not strange that there developed in this country, step by step, decade after decade, an industrial mechanism to serve the requirements of the people. Within the period of a relatively short national existence, our system of responsible private initiative, our American way of life, has built a nation of the highest rank in world affairs. That exalted position has not been achieved and held by the arbitrary operations of a despot or bureaucracy. Neither is it the material result of collectivism. The ambition and efforts of free citizens and free institutions have built the complicated structure which has served us so well.

In no other land is the standard of living so high; nowhere is there an equivalent abundance of desirable goods; nowhere is such financial or economic strength to be found. If there be in any quarters a dispostion to yield to the enchantment of foreign ideologies, socialism or communism, let the tempted call the roll of the nations, one by one, appraise their situations, and judge the merits of the respective systems by the evidence revealed. Let such words be proclaimed from the housetops, with echoes and reverberations that will convince those apostles of strange doctrines in our midst that we are unwilling to foresake our heritage, tried and true, of demonstrated worth.

*—From an address before the Third National Industry-Army Conference.*


The Best Combination
for FINE ENGINE PERFORMANCE

Johnson ADJUSTABLE TAPPETS
and the
Johnson SELF-LOCKING TAPPET SCREW

The Johnson Self-Locking Tappet Screw is made from the finest Steel, accurately heat treated to give it toughness and long life. The flexible spring action of the diaphragm holds the threads fully and rigidly seated at all times. The entire load is carried by the solid portion of the screw.

The Johnson Self-Locking Tappet Screw has no leading edges and is not self-tapping. Effectiveness is maintained through any number of adjustments.

Write today for the latest Johnson TAPPET BULLETIN.

Johnson PRODUCTS INC.
MUSKEGON, MICHIGAN
"Tappets Are Our Business"


## Geneva Salon

(*Continued from page 28*)

The general trend of the Italian engines is toward increased power by multiplication of valves-in-head and by increasing the compression ratios. The more powerful four-passenger cars have more room for the passengers and in addition to increased speed the cars have better suspension systems. The bodies, as usual, are excellent and, this year, more aerodynamic than ever.

The Cisitalia Sport model, for example, has a water-cooled four-cylinder 66.4 cu in. engine with a compression ratio of 7.5 to 1, mechanical fuel pump and pressure lubrication. The car has the conventional rear-wheel drive and four forward speeds. It has independent front-wheel suspension and hydraulic brakes. It can do better than 90 mph.

German production, to judge from the Hansa 1500, is well on the way to restoration. This car, the first postwar German prototype, has a four-cylinder engine, 8-hp (European rating) with a compression ratio of 6.5 to 1. The engine is water-cooled. Maximum speed is about 76 mph.

While German production has not yet overcome all the difficulties facing it, the specimens on display indicated the rebirth of many of the remarkable qualities of prewar German cars plus a sharp improvement in shedding the excess weight which was typical of many German cars in the past.

The Czechoslovak "midgets," Skoda and Tatra, are still fine little cars but this year did not show any particularly revolutionary improvements or changes. The chief trouble for owners of these cars in western Europe is the difficulty of obtaining spare parts, now that Czechoslovakia is behind the "iron curtain" and her economy directed increasingly toward the east.

The Dutch Gatso is an honest-looking car without any striking innovations this year.

For the first time since the war, Austria is bidding for a place in the international market. Its entry was a Porsche 356/2 with a four-cylinder engine of 68.93 cu in. displacement and a

(*Turn to page 86, please*)

**WANTED:** *A better metal for water pump shafts.*
Working conditions bad...no vacations...
hard physical labor...long hours.
THE TWIN COACH COMPANY
KENT, OHIO

*"K" Monel-shafted bus water pump, manufactured by the Sherwood Brass Company of Detroit, Mich. for the Fageol Products Company, Kent, O.*

# Position Filled by "K" Monel*

Yes...it's a tough job, being a bus water pump shaft. Most metals don't last long at it, as any maintenance man will testify.

That was the situation at the Twin Coach Company. Water pump shafts in their buses were failing with monotonous and costly regularity. Then one day they asked the Fageol Products Company—if something couldn't be done about it.

Something could. The Fageol Products Company came through handsomely. Twin Coach's pumps are now equipped with "K"* Monel shafts...and things are looking *up* in the maintenance department.

Mr. A. G. Hilf, Vice President in charge of production at the Fageol Products Company explains it this way:

*"'K' Monel was chosen for water pump shafts because:*

1. *It is corrosion resistant.*
2. *It can be heat-treated to secure satisfactory hardness.*
3. *It expands only slightly during extreme variations in water temperatures.*
4. *It has high resistance to corrosive mineral salt deposits encountered in some localities.*

*"This combination of desirable characteristics should result in greatly increased service life and much reduced maintenance in 'K' Monel-shafted pumps."*

Because of its unusual properties, "K" Monel has an excellent service record in a wide range of industrial "task" applications. In fully age-hardened condition, "K" Monel has a minimum yield strength of 100,000 psi, and a tensile strength of over 140,000 psi. Cold-drawn, age-hardened "K" Monel has a Brinell (3000 kg) hardness of 265—320. In addition, this alloy is rustproof and resistant to most commonly-encountered corrosives. And of particular importance in vehicular applications, "K" Monel offers high resistance to fatigue failure.

For further information, ask for Bulletin T-9, *Engineering Properties of "K" Monel*. Remember, too, that our Technical Service Department is always ready to help with your specific metal-selection and fabrication problems.

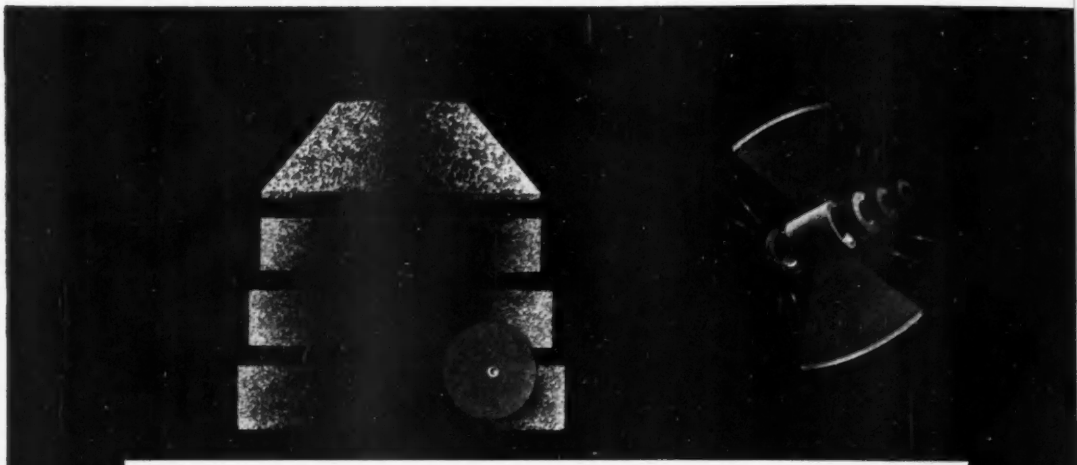
**THE INTERNATIONAL NICKEL COMPANY, INC.**
***67 Wall Street, New York 5, N. Y.***

*Reg. U. S. Pat. Off.

Monel*

**...FOR MINIMUM MAINTENANCE**

EMBLEM OF SERVICE
INCO
TRADE MARK



# Put the bee on high grinding costs

***Are you*** getting the longest possible life out of your grinding wheels? Are your dressing expenses as low as they could be, your stock removal still high?

Now is the time to sweeten your business with some good grinding procedures that will help lower your grinding costs. You can increase the efficiency of most of your grinding operations by consulting with a Peninsular engineer.

Over half a century of experience and research goes into Peninsular grinding recommendations. *Why not call on Peninsular experts to study your grinding jobs?*

First, they will conduct an on-the-ground analysis of your grinding machines, the methods you employ, and the materials you grind. Correct wheel formulas will then be drawn up and presented to you. Recommendations will be included which are designed to put the bee on high grinding costs and to increase your production.

***Remember:*** Every prescribed Peninsular grinding wheel—resinoid or vitrified—is *custom-tailored to fit the individual job.*

**The Peninsular Grinding Wheel Company,** 729 Meldrum Ave., Detroit 7, Michigan. *Sales Offices:* Chicago, Philadelphia, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

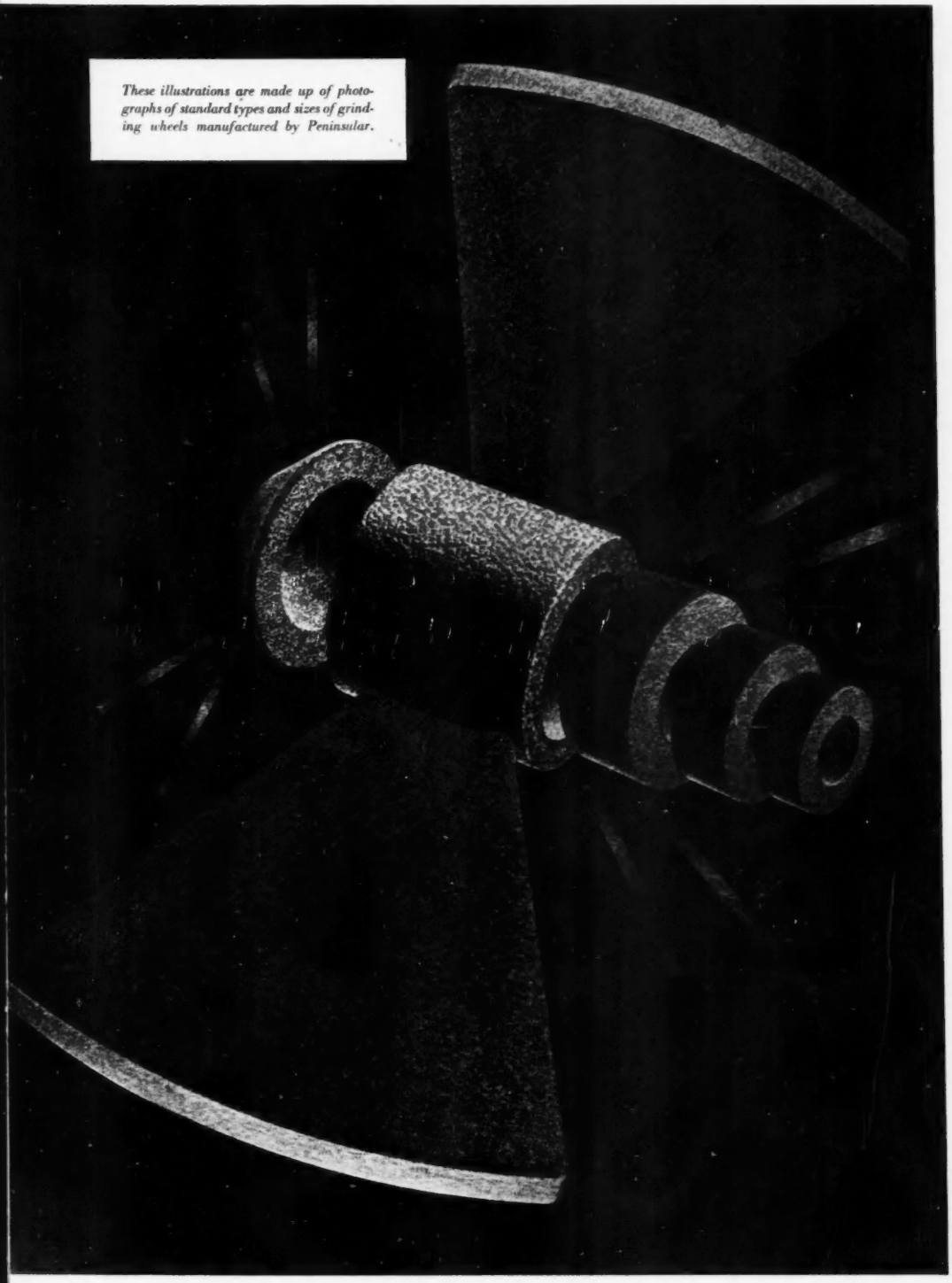
# PENINSULAR

*INDIVIDUALLY* PENINSULAR *ENGINEERED*

## GRINDING WHEELS

*SINCE 1889*

**SPECIALISTS IN RESINOID AND VITRIFIED BONDED WHEELS**



*These illustrations are made up of photographs of standard types and sizes of grinding wheels manufactured by Peninsular.*

compression ratio of 7 to 1. (See AUTOMOTIVE INDUSTRIES, Oct. 1, 1948, page 44). This is a valve-in-head job with two Solex carburetors, a Bosch generator and an air-cooling system. The engine is placed at the rear of the car. Top speed is about 90 mph.

The general impression one got from seeing all these cars is of a ceaseless struggle by the makers for better quality, increased efficiency and greater beauty.

## French 1948 Production

FRENCH automobile production for 1948 totaled 198,372 vehicles of all types, these being classified as follows: Passenger cars 100,091; trucks 93,376; buses and coaches 3698; special vehicles (fire engines, ambulances, etc.) 450; road tractors 757.

There was little change in the production from the different factories. Citroen continued to hold the lead in passenger cars, with a total of 34,164 units, followed by Renault with a cheaper and lower-powered car at 29,917. Peugeot occupied third place with 19,130; Simca (French Fiat) was fourth with 9271, while Ford production was 4270.

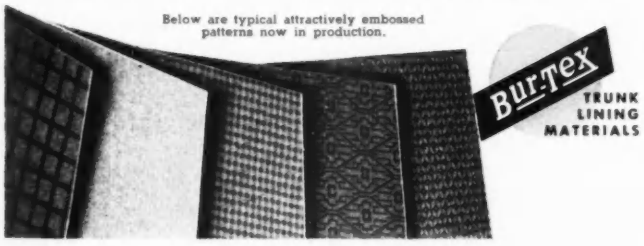
Renault was the biggest truck producer (37,659), followed by Peugeot, Ford, Simca, Citroen, and Hotchkiss. The statistics do not take account of the tonnage of the trucks and some of the above were small delivery vehicles. Chausson headed the list of coach and bus producers, with a total of 1057, Renault being second with 919.

French exports totaled 79,446 motor vehicles for the year. These were 58,764 passenger cars, 19,790 trucks, 780 buses and coaches, 67 road tractors, and 45 special vehicles.

- ELIMINATES ANY POSSIBILITY OF DRUMMING NOISES IN THE LUGGAGE COMPARTMENT.
- Simple to install in single time-saving operation.
- Lasts as long as the automobile you build.
- Plastic coated, plastic printed surface is easy to wash.
- Available in any color or pattern to suit your styling requirements.

**BURLINGTON MILLS INC. • Burlington, Wisconsin**

Below are typical attractively embossed patterns now in production.





## Cummins Introduces New High-Power Diesels

(*Continued from page* 37)

pumps are used on the NVH series; each serves six cylinders.

Fuel speed is controlled manually, but the idle speed is maintained by a low-speed governor and the maximum speed range by a high-speed governor. The engine is further protected by an overspeed trip and by the built-in characteristics of the fuel pump which limits the speed in the event of line failure.

The electrical equipment includes a 32-volt generator of 350, 750 or 1500 watt capacity, 32-volt starting motor, voltage regulator, and push-button starting switch.

The other new Cummins Diesel engine, Model HRBS-600, has been designed to meet demands for horsepower capacities not previously covered by the standard Cummins line. It develops 225 hp at 1800 rpm.

This six-cylinder, overhead valve engine has a 5½ in. bore and a 6-in. stroke with a 743 cu in. piston displacement. Other mechanical features include four valves per cylinder—two for intake and two for exhaust, increased flow lubricating systems, buttress-type oil pan and flywheel housing, a newly designed lubricating oil cooler of the water jacket type, and a Roots blower.

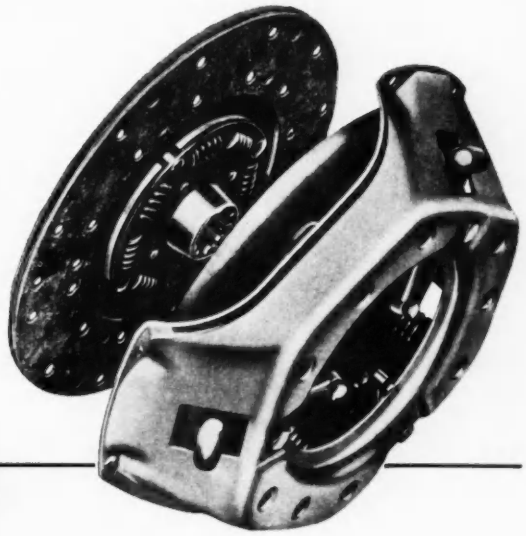
### *Fourth Safety Award for Firestone*

For the fourth consecutive year the Firestone Tire and Rubber Co. has received the National Safety Council's Award of Honor for distinguished service to safety.

### *Fairchild to Stop Making Light Personal Planes*

J. Carlton Ward, Jr., chairman of the board, Fairchild Engine and Airplane Corp., has announced that his company will discontinue the manufacture of light personal planes.

In stop-and-go traffic driving, Long clutches give smooth, positive, effortless performance. At highway speeds, the semi-centrifugal construction means increased torque capacity—less slippage, less wear. They have equipped millions of cars, trucks, buses and tractors since 1922.



# LONG

## *Clutches and Radiators*

- EFFICIENT ENGINEERING
- VOLUME PRODUCTION
- TIME-TESTED PERFORMANCE

Long radiators have been used throughout the automotive world since 1903. Fin-and-tube design and construction provide clean, unobstructed water courses . . . maximum heat exchange. In heavy-duty commercial engines or high-speed passenger cars, this means engines that run cool.

LONG MANUFACTURING DIVISION
BORG-WARNER CORPORATION
Detroit 12 and Windsor, Ontario

**LONG**
**CLUTCHES • RADIATORS • OIL COOLERS**

# Four Applications of Induction Heating

(*Continued from page 43*)

—quench in water spray, reheat with 9600 cycles to 350 F. This achieves a semi-contour hardening with core hardness extending approximately up to the pitch line. This applies principally to transmission gears.

3. Spiral or helical gears. Heat for hardening temperatures with 9600 cycles, quench in high pressure oil in submerged spray (40-90 psi).

4. Cylindrical surfaces—crankshafts, etc. Heat with 9600 cycles to hardening temperature, water spray quench. Stationary heating with quench spray through the inductor or progressive heating in which work is fed through the heating coil into the spray quench.

5. Small sections or odd shapes. Heat with approximately 450,000 cycles to hardening temperature and water quench. This applies to very small gears, small wear surfaces, bearings on thin cylinders, or small diameter shafts, etc., and usually achieves a relatively thin hardened area.

6. Splines hardened for wear only. Heat with 450,000 cycles, water quench.

7. Splines hardened for torsional properties. Heat with 9600 cycles, static or progressive method, quench with high pressure oil spray.

In most cases the generating equipment is separate from the heating stations. Most of these high frequency generators are located overhead above the induction department.

Principal economies result from the use of carbon steels in place of alloy steels, and the elimination of many machine operations resulting from distortion which accompanied previous heat treating methods. Also in many cases, heat treating costs are lower and quality greatly improved due to lack of distortion and better stress distribution.

### Brazing and Soldering

All production brazing and soldering jobs at Louisville Works are accomplished by induction heat. The accompanying illustration shows an intricate tube and forging assembly being brazed in a 20 kw, 9600 cycle machine. The parts of the assembly are fluxed and put together with a small ring of silver solder in the joint. The assembly is heated in an induction coil and brazing takes place when the flow temperature of the silver solder is reached. Induction heat produces uniform localized heating which contributes to increased quality and economy of the operation.

### Shrinking Problems

Several production shrinking jobs utilize induction heating. A total of 240 kw is employed in this manner, heating ring gears with 60 cycle power, employing a movable split transformer core, using the gear to be heated as the short-circuited secondary of the transformer. This method is also used to preheat heavy gears as discussed previously. The illustration shows a large rear axle drive gear being heated for shrinking onto a hub.

Application of induction heating has presented many new problems. An installation of this size necessarily requires specialized maintenance and rigid metallurgical control. Many applications involve substitution of higher carbon steels requiring careful attention to machining methods and in some cases loss in tool life and production. In general, however, the results of this wholesale application of induction heat have been very gratifying.


PALNUT SELF-LOCKING NUTS
TRADE MARK

—for many years STANDARD EQUIPMENT ON AIRCRAFT ENGINES AND ACCESSORIES

PALNUTS have proved their unfailing security on practically every type of aircraft engine used by Army, Navy and Commercial planes from the earlier days of aviation, up to and including today's jet engines.

Right: Westinghouse J-34-WE "Yankee" turbojet engine uses PALNUTS to lock regular nuts holding sections.

Below: Pratt & Whitney 3500 hp., 28 cylinder Wasp Major engine uses PALNUTS on all cylinder studs.

PALNUT ADVANTAGES

- Unfailing security under severe vibration
- Light weight, small space
- Easy assembly with ordinary tools—high speed assembly with power tools
- May be removed and reused
- Very low in cost

Outline your needs for free samples of PALNUTS. Write for descriptive literature.

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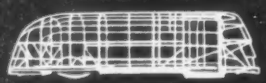
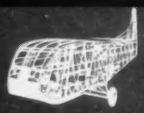
Millions of all types of PALNUTS used monthly by automotive manufacturers on connecting rods, brake parts, engine mountings, body hold down, etc.; also on moulding strips, medallions, lights, dash, glove compartments, etc.

# Michigan WELDED STEEL TUBING

*The Modern Electric Resistance Welded Steel Tubing*



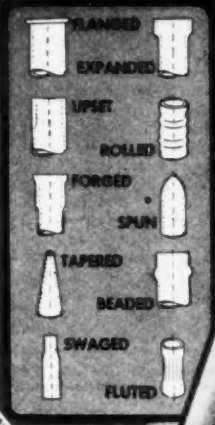


**ROUND** **SQUARE** **RECTANGULAR**

⅛" To 4" O. D. 9 To 22 gauge

½" To 2" 20 gauge—1" To 2¼" 14, 16, 18 gauge

## *Can be* BENT *also . . .*



## *Men of Vision*

have made America the greatest industrial country the world has ever known. And its continued leadership depends upon the progress these men make in finding new methods for greater production of better products at lower cost.

Because of its fabricability, ductility, ease of assembly and installation, and for many other reasons, the metal working industry is constantly finding new uses for **MICHIGAN WELDED STEEL TUBING**. Whether you form and machine the parts in your plant or order them prefabricated by Michigan, you will find this tubing exceptionally uniform in structure and adapted to reworking by any production process.

*Engineering advice and technical help in the selection of tubing best suited to your needs. Address your inquiries to:*

## *Michigan* STEEL TUBE *PRODUCTS CO.*

*More Than 30 Years in the Business*

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## Automatic Transmissions

(*Continued from page 36*)

a hydraulic fluid of relatively low viscosity. Shock losses occur chiefly at the entrances to the passages through the various elements of the converter. The importance of low viscosity has long been recognized, and the prospects of material progress along that line are not particularly bright, though some of the large petroleum companies are said to be studying the problem. Shock losses, however, can be reduced in various ways. One method consists in using two or more stages of runner blading, with intermediate stages of reactor blading, the principle involved being the same as that of multi-stage axial flow steam turbines and air compressors. Another possibility lies in reducing the range of torque multiplication which the converter must provide, by combining the converter with a geared transmission giving one or two positive gear reductions. Finally, the reactor of a converter which acts as a hydraulic coupling in normal operation can be made in sections, each with its own overrunning clutch units. If the blades of these sections make different angles with the axis of the flow path, the sections will begin to free-wheel at different speeds. In this way the depression in the efficiency curve at the junction of the converter and coupling portions will be filled in and the speed range within which there is coupling action will be reduced. This point will be further discussed in another installment.

The first automatic transmission offered by an American firm as special equipment on a passenger car was General Motors' Hydra-Matic, which became available on Oldsmobiles and Buicks in 1940. A predecessor of the Hydra-Matic was the Safety transmission announced in 1937. It incorporated essentially the same planetary units and hydraulic control features as the Hydra-Matic, but did not have the hydraulic coupling of the present unit. The reversing gear, moreover, was of the conventional shifting type, instead of planetary. It seems that with this early transmission the automatic gear changes were not sufficiently smooth, and passengers occasionally experienced that "bump in the back" which one gets in an ordinary car if the driver allows the clutch to take hold too rapidly. The present Hydra-Matic is a four-speed planetary transmission with automatic control by hydraulic means, combined with a fluid coupling through which all of the engine torque is transmitted in two of the four speeds, and a fraction in the other two.

In addition to the Hydra-Matic, which is available on Cadillac, Oldsmobile and Pontiac models, two other speed-sensitive transmissions are being offered American car buyers. One of these is the Chrysler hydraulically operated four-speed transmission, the other the General Motors' Dynaflow, which has been special equipment on certain Buick models during the past year and is standard equipment on the Buick 70 this year. The Chrysler is a constant-mesh synchronized transmission, and therefore is most closely related to the conventional. It has two forward operating ranges, high and low, which are selected manually, but the changeover from one speed to the other in the same range is effected virtually automatically, although the driver must release the accelerator pedal momentarily to reduce the friction that must be overcome by the power shifting device, or depress the accelerator beyond "full throttle" to shift down under some conditions. Practically all ordinary driving is done in the high range, and as long as the car remains in this range neither the clutch nor the selector lever needs to be touched.

The Dynaflow combines a hydraulic torque converter of relatively low stalling torque with an emergency low and reverse gear of the planetary type. While the Hydra-Matic and the Chrysler both have four definite torque ratios, in the Dynaflow there are no

(*Turn to page 94, please*)


for LIGHT JOBS

EASY RIDING *cradled by Tuthill Leaf Springs designed especially for the Crosley*

like this NEW CROSLEY

and big ones like power shovels...

TUTHILL *Alloy Steel* SPRINGS

are engineered to specific applications in every field. Tuthill engineers are equipped to solve your special spring problems. Write or phone today!

*Special Leaf Springs Designed to Meet Your Requirements*

*Quality Springs Since 1880*

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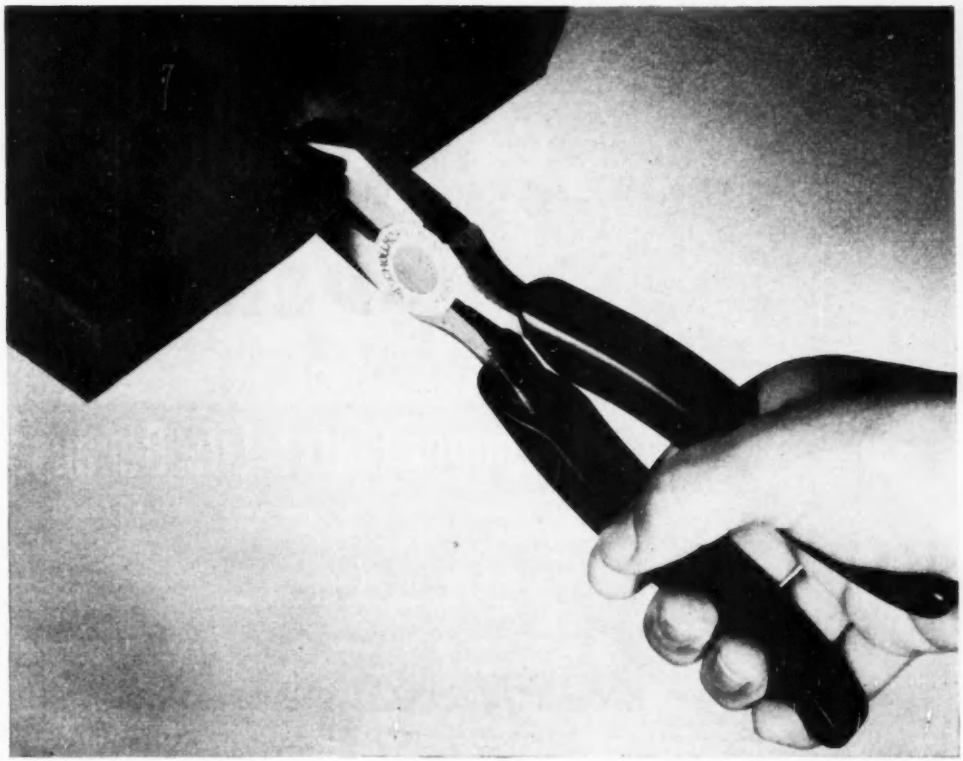

*Bone hard tool handle and soft sponge made with Hycar*

## Do you want HARDNESS RANGE?

# *Hycar has it plus!*

### ...AND THESE 8 OTHER ADVANTAGES!

1. Abrasion Resistance—50% greater than crude rubber.
2. Extreme Oil Resistance—insuring dimensional stability of parts.
3. High Temperature Resistance—up to 250° F. dry heat; up to 300° F. hot oil.
4. Minimum Cold Flow—even at elevated temperatures.
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6. Light Weight—15% to 25% lighter than other American rubber.
7. Age Resistance—exceptionally resistant to checking or cracking due to oxidation.
8. Non-adherent to Metal—compounds will not adhere to metals even after prolonged contact under pressure. (Metal adhesions can be readily obtained when desired.)

For more information, write or ask your supplier to write B. F. Goodrich Chemical Company, Dept. HC-4, Rose Building, Cleveland 15, Ohio.

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*American Rubber*

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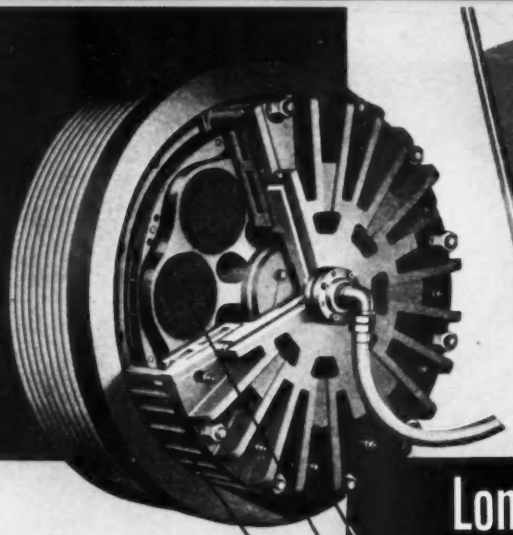
**GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers**



# EXCLUSIVE IN DANLY PERMITS

## Longer Clutch Life Because:

1. Greater mass is in continuous rotation, resulting in lower starting torque, less heat.
2. Heavy circular friction discs last longer – more than 8,000,000 engagements with negligible wear under test.
3. Positive air circulation dissipates heat, cooling all clutch elements.

## HOW IT WORKS

Air-operated, the DANLY clutch responds instantly to convenient push button electrical controls. Low energy clutching is obtained with an exclusive design which requires starting only one-fifth of the mass that is subject to acceleration in conventional press clutches.

### LOWER STARTING TORQUE AND INCREASED FLYWHEEL ENERGY

Only the comparatively small weight of the drive shaft, the friction discs and retainer wheels are started and stopped in each press cycle. The greater mass, back-up plates, cylinder and piston, and clutch housing are in continuous rotation, actually increasing effective flywheel energy. This results in lower starting torque, more sensitive stop and go for repeated "inching" and single-stroking operations, with much less heat generated.

### COOL OPERATION ASSURES LONG LIFE

*Clutch maintenance* usually comprises the largest share of press "down time" for repairs. Heat generated by the clutching action is the greatest cause of clutch failure. What heat is generated in the DANLY clutch is quickly dissipated by forced air circulation, before any undesirable temperature rise can occur. This cool operation contributes to long life of the friction discs and all non-metallic elements of the clutch. A centrifugal fan, built into the clutch housing, draws in a large volume of air. Air circulates through ample passages around all working parts.

### PRESS DOWNTIME AND STAMPING COSTS REDUCED

Thus, in DANLY mechanical presses, "down time" for clutch servicing is substantially reduced and long service life assured by advantages of the efficient DANLY friction clutch. Uninterrupted work means *more profitable press operation.*

### ENGINEERING ASSISTANCE

Danly engineers can help you in solving problems pertaining to stampings and press operation. Send full details for specific recommendations. No obligation.

*Free*

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Get the complete story! Learn how DANLY Presses can contribute to lower costs and increased production—write for literature today.

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DANLY

MECHANICAL PRESSES AND PRESS EQUIPMENT

# CLUTCH DESIGN MECHANICAL PRESSES

## *Profitable Uninterrupted Operations*

### *Other* DANLY PRESS *Advantages*

**BUILT-IN AUTOMATIC LUBRICATION** — Circulates clean filtered oil continuously to all bearing surfaces in the crown and slide.

**NEW* PITMAN WRIST-PIN DESIGN**—3-point support for wrist pin eliminates shearing and minimizes deflection. Simplified design permits precision fitting of parts.

**ALL-STEEL WELDED FRAME**—With box-type uprights. Weldments are stress relieved for permanent alignment.

**MASSIVE DESIGN**—All members built to carry loads of rated press capacity. Extra rigidity maintains accurate die closure, even under heavy off-center loading.

**PRESS SAFEGUARDS** — Press cannot be operated until both air and oil pressures are raised to the required level. The press is stopped if either drops below the safety point.

**OPERATOR SAFETY** — To start press, "run" buttons must be pressed simultaneously, requiring operators hands to be clear of the press.

**SIMPLE CYCLE SELECTION**—Danly controls are installed and press-tested to save installation time — include 5 position selector switch and reversing circuit.

25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

Silicone News

DC

SILICONES

## DC Silicone Fluid Stabilizes Versatile Force Measuring Device

Thrust, torque and other kinds of force are measured by air in a device so sensitive and versatile that the same unit can measure the thrust of a 2000 h.p. engine while responding to the weight of a coin. It is used in the cradle dynamometer measurement of aircraft and automobile engines, the testing of piston rings and axles and automatic batch weighing. And it operates without any movement of the measured system.

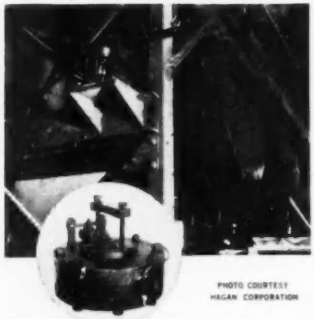

PHOTO COURTESY HAGAN CORPORATION

*Accuracy of air operated, null displacement "ThrusTorq" is stabilized by DC 200 Fluid in viscous damper.*

The "ThrusTorq" made by Hagan Corporation of Pittsburgh is essentially an air chamber, one side of which is a flexible diaphragm. A poppet valve admits compressed air until pressure in the air chamber exactly balances the force exerted on the diaphragm by the torque arm. When the force is reduced, air is exhausted to maintain equilibrium. Air pressure required to balance the force is registered by a manometer, or gauge calibrated in foot-pounds.

But the stability of a system for balancing inertial forces depends upon adequate damping. That is done most effectively by DC 200 Silicone Fluids in a viscous damper consisting of two diaphragm chambers connected by a small orifice in the partition plate.

Critical damping and more compact hydraulic systems both depend upon the remarkably low rate of viscosity change in DC 200 Fluids over a wide temperature range. For more information about these silicone fluids including data on resistance to oxidation and to mechanical shearing, lubricity, water repellency and dielectric properties, phone our nearest branch office or write for booklet C13 M2.

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Dow Corning

FIRST IN SILICONES


fixed torque ratios. This transmission also affords two operating ranges, referred to as the driving and the emergency low range, and in each range the torque ratio varies gradually or uninterruptedly from the maximum to the minimum.

Although the three transmissions mentioned in the foregoing are of basically different types, they all have two features in common. In all of them the drive always is through a hydraulic unit which serves to cushion shocks and provide that smoothness which is the characteristic feature of these transmissions. The other is that hydraulic units are used for some or all of the shifting operations. Valves controlling the hydraulic forces to engage the clutches in the Hydra-Matic are operated by centrifugal devices, a governor acting through electrical devices controls the hydraulic shifting of gears in either range of the Chrysler transmission, and low range of the Dynaflow is engaged by hydraulic means, controlled by a hand-operated lever.

## Improved Engine Balancer

*(Continued from page 29)*

By running the engine at its resonant period, amplification is gained in registering vibration. For that reason the engine is turned over at a speed equivalent to 36 mph.

Only a single drill, controlled by a handwheel, is necessary to remove unbalance at the flywheel. Any front end unbalance, which occurs rarely, can be corrected either by replacement of the harmonic balancer or drilling metal from it at assembly.

Capacity of the drive motor on the balancer has been stepped up from 15 to 20 hp. The new power-drive assembly is equipped with an eddy current clutch arrangement which eliminates the former more complicated control system for converting alternating to direct current for the drive motor. Also linked with the drive motor is an "inching" button. This button controls the clutching device and is used by the operator to move the indexing wheel to the phase angle at which the flywheel is unbalanced.

The new model balancer also has an improved air cyclinder control for the release or engagement of the engine clutch during the balancing operation.

One of the main new balancer features is the automatic transmission or Dynaflow adapter. Hinged to the unit on the side opposite the operator, it is counterweighted for easy handling when swung in or out of place. While in use it links with the main shaft from the drive motor and fits to the Dynaflow transmission flywheel housing with a pair of dowels and is clamped rigidly thereto.


# Would you like to have the opportunity to slash your spring costs?

THE KEY to lower spring costs is in design and manufacture. Perhaps in your own case, a small modification in design which would not affect your product's performance would make it possible to substantially reduce the cost. Or maybe your springs are being made in several operations when one would suffice. Skilled springmakers here at Accurate have the experience — the "know-how" — to recognize such conditions *and to correct them!* Our manufacturing facilities are modern and complete — we have the equipment to do the job right, at the lowest cost to you.

We would welcome the opportunity to show you what we have done for others and point out what we can do for you. Write, wire or phone, today; your inquiry will receive prompt attention.

Accurate Springs

**A dependable source of supply!**

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*Springs, Wire Forms, Stampings*

# Every car needs this

(Trico Rainbow Blade shown)

FOR *safer* driving, every windshield needs a Trico Automatic Windshield Washer.

Nearly 4 million already are equipped.

And now that fourteen makes of cars have special built-in provisions for speeding up installation by car dealers, service stations and independent repair shops, the "Two Little Squirts" are finding greater acceptance than ever.

Trico's national advertising in the Saturday Evening Post, Life, Time, Collier's and the Country Gentleman continuously promote universal use of this important safe-driving aid.

• • •

*Factory installed by Buick, Cadillac, Oldsmobile and Pontiac.*



● *Can be used freely to wash off road mist, dust, grime and mud. Entirely automatic. Nothing to pump.*

TRICO

## *Windshield Washers*

TRICO PRODUCTS CORPORATION, BUFFALO 3, N. Y.

PAGE

*Stainless Steel*

WIRE

ROUND

FLAT

OR

SHAPED

PAGE has been drawing stainless steel wire since the earliest development of stainless—for many manufacturers has become "Wire Headquarters."

Think of PAGE as a responsible source for wire—stainless steel, high or low carbon steel. Whatever your problem involving wire . . .

*Get in touch with Page!*

ACCO

Monessen, Pa., Atlanta, Chicago, Denver, Detroit, Los Angeles, New York, Pittsburgh, Philadelphia, Portland, San Francisco, Bridgeport, Conn.

PAGE STEEL AND WIRE DIVISION
AMERICAN CHAIN & CABLE

## Rochester Products

(*Continued from page* 32)

removal of gates. Then a group of five booster conveyors—eight-in. wide canvas belts running 35 fpm—takes parts from underneath the trim presses and drops them onto a belt conveyor. The latter, a steel belt 35-in. wide and traveling at 30 fpm, is about 80 ft long, and contains five separate channels.

This belt then joins an inclined canvas belt conveyor onto which the parts are swept. Parts are transported to a group of four booster conveyors which sweep them off the belt and carry them to the first operation trim presses in the background in Fig. 2. Trimmed parts are returned to the inclined canvas belt by means of three booster conveyors and a chute.

Fig. 2 shows die castings moving in their channels on the inclined conveyor running from the extreme right to meet the main flight conveyor at the left. The latter carries the trimmed parts to a hopper from which the parts are distributed to all subsequent operations, including various machining stages.

It may be noted that the conveyor system described sketchily here is designed for the automatic movement and automatic transfer of parts in and out of the large battery of trimming presses located in the center background in the illustration.

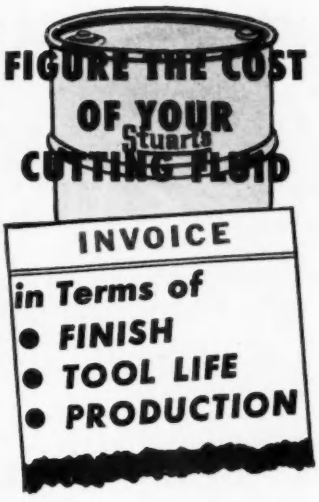
This belt system together with its booster conveyors and chutes ties together an entire series of operations in presses in a completely mechanized fashion.

Dominating the scene in this plant is the extensive conveyor system for transporting tubing in coils from the tubing mill section to the fabrication stations for cutting and bending and sub-assembly operations. At the same time the conveyor is sufficiently long to serve as a storage conveyor. This conveyor system consists of a four-in. I-beam track with four-in. trolleys on rivetless chain having a variable speed ranging from four to 12 fpm. It is about 1350 ft in length with 500 hangers, each one capable of carrying 250 lb of tubing in four-ft coils. Total capacity of the system is 125,000 lb comprising, on the average, 360 miles of tubing.

About 14,000 lb of tubing is handled on and off the conveyor in an eight-hour day.

One of the noteworthy operations is the high speed line for the assembly of locks produced for GM cars, including units for doors, trunks, and glove compartments. Assembly is done by operators at closely spaced stations along a pallet assembly conveyor about 290 ft in length. About 2400 locks are assembled per hour with a conveyor speed of two-fpm, having about 300 pallets in the line. The conveyor serves to maintain a steady flow of production, provides transportation between successive operations, and keeps lock combinations

(*Turn to page* 98, *please*)




IT is *wise economy* to buy cutting fluids on a basis of performance rather than on a price basis. This is borne out by the case of a large screw products company in Chicago machining 11/16" round stainless steel types 303 and 440. Operations include forming, drilling and reaming on a New Britain-Gridley automatic screw machine. A number of different cutting oils had been used on this job until one was found that seemed to give relatively satisfactory performance. However, this product was replaced after the first trial with Stuart's Thred-Kut. Not only was there a marked improvement in finish, but *tool life was increased 3 to 4 hours and daily production was increased.*

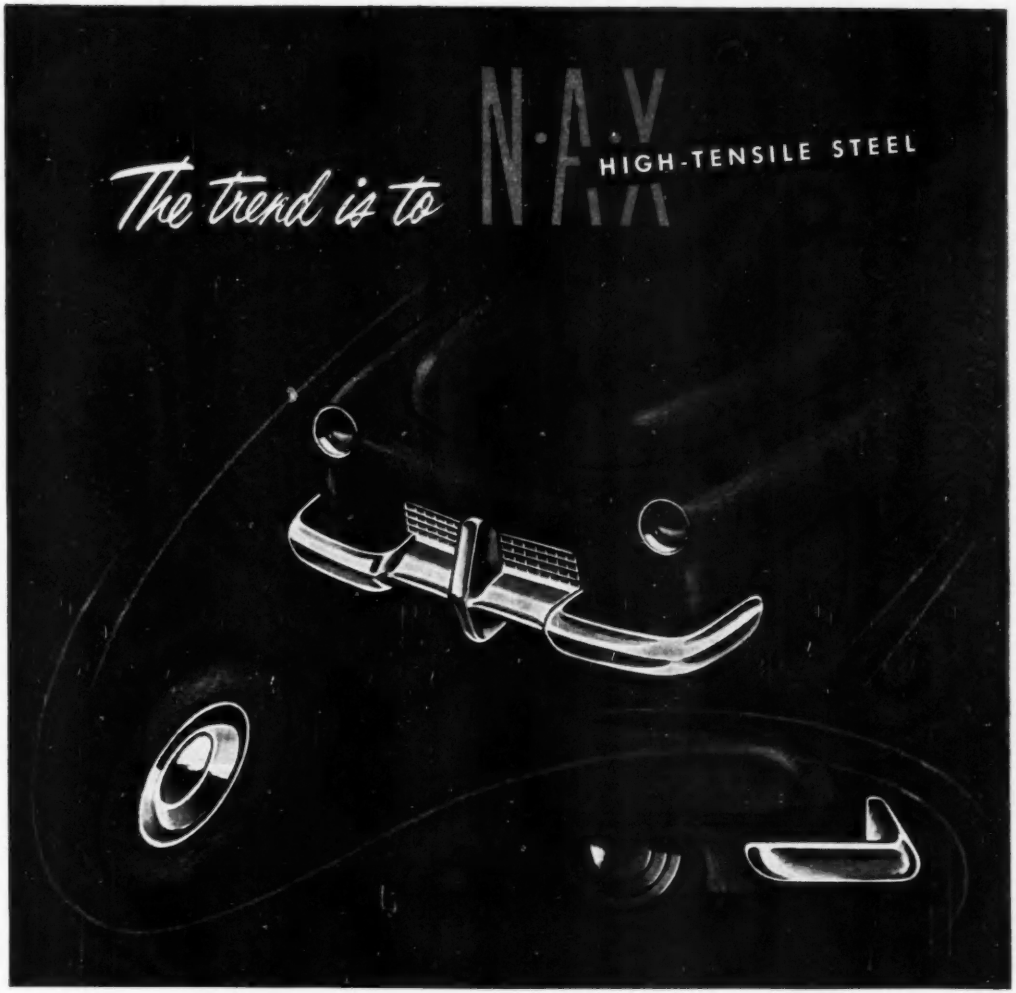
The above case study is a typical example of how the best cutting fluid for the job will pay its original cost over and over again. D. A. Stuart Oil Company representatives preach the gospel of "Wise Economy." They can help you cut costs with cutting fluids best suited to your requirements. Ask for booklet, *Cutting Fluids for Better Machining.*

STUART *service goes with every barrel*

D. A. Stuart Oil Co.

2733 S. TROY ST., CHICAGO 23, ILL.

*The trend is to* N·A·X HIGH-TENSILE STEEL



Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

Bumpers and grilles—hoods and fenders—body panels and deck lids—frames and bracings—wheels and hub caps represent a few of many applications of N-A-X HIGH-TENSILE steel to the modern car.

MAKE A TON OF SHEET STEEL GO FARTHER
Specify— N·A·X HIGH-TENSILE STEEL

N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950

**GREAT LAKES STEEL CORPORATION** N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
*Unit of National Steel Corporation*

"SUPPLYING industry with H-VW-M equipment for electrolytic applications brings up many straightforward questions. This one's duck soup to answer.

"To start with, H-VW-M automatic conveyors are versatile. They can be used for cleaning, pickling, plating, anodizing, bright dipping, or a combination of many different treatments and coatings. There's a size and type for each individual application. In many instances the full automatic type serves best—

improves working conditions, maintains a high quality product and develops savings that more than justify the investment—even where the work is highly diversified.

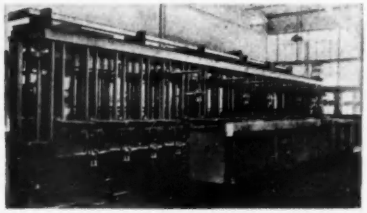
"Wherever H-VW-M conveyors—full or semi-automatic, or combinations of both are installed they pay off many ways: Reduce rejects, lessen cost per unit of processed work, noticeably improve uniformity of finished product. Hundreds of H-VW-M conveyors are in successful operation today in many different industries.

For complete information, ask your H-VW-M representative for copies of bulletins FA-103 and SA-101, or write to headquarters.

*"What's so good about H-VW-M AUTOMATIC CONVEYORS?"*

**M. J. MOLL, Chief Equip. Sales Engineer, H-VW-M COMPANY**

Hanson-Van Winkle-Manning has supplied the plating industry for over 70 years. Our sales-engineers are thoroughly familiar with every step in the process of electroplating and polishing. It is this overall knowledge that has made H-VW-M "Headquarters" for electroplating and polishing equipment, supplies and technical assistance.



**HANSON-VAN WINKLE-MUNNING COMPANY**
**MATAWAN, NEW JERSEY**

*Manufacturers of a complete line of electroplating and polishing equipment and supplies*

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Grand Rapids • Matawan • Milwaukee • New Haven • New York • Philadelphia
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SINCE 1872

4030

in consecutive order.

Keys are fed to the main assembly line on an overhead conveyor 518 ft long, with 345 hangers spaced at 18-in. intervals, each hanger holding 16 containers of keys—four containers each of four different combinations. The function of this conveyor is to deliver keys with different combinations in correct order of usage. It has a variable speed from nine to 27 ipm, and is timed to pace the assembly line.

The carburetor for the Olds V-8 engine is assembled by operators grouped at stations about a bench-height carousel having 117 pallets, with a working length overall of about 150 ft. The conveyor has a variable speed range from two to six fpm and the line is capable of producing 100 carburetors per hour.

Carburetor assembly also includes two other carburetor lines and the entire department is traversed by an overhead conveyor running about 734 ft in length and having a variable speed from 7 to 21 fpm. It contains 367 hangers, each one capable of holding four carburetors. Completed carburetor assemblies of all types are loaded on this conveyor from the final inspection stations, for transportation to flow tion stations.

A late development of real interest is a continuous plating system for copper plating certain types of steel tubing. It consists of a series of separate tanks tied together to form a continuous process.

**Individually Tested... TO INSURE BETTER PERFORMANCE!**

IMPROVED SPRING CLAMP

"C" CLAMPS

HAND SCREW

QUICK CLAMPS

NO. 640 IMPROVED "I" BAR CLAMP

**HARGRAVE**

Hargrave Clamps have been constantly improved with the aid of skilled mechanics to offer greater operating advantages and increased durability. Individually Tested, they must be stronger, tougher and flaw-free. Made in openings from ¾ in. to 10 ft., from ½ in., to 16 in. deep.

**WRITE FOR CATALOG**

showing the complete line of Hargrave Individually Tested Clamps, Chisels, Punches, Brace Wrenches, Star Drills, Washer Cutters, File Cleaners, etc.

**THE CINCINNATI TOOL COMPANY**
**4056 Montgomery Road**
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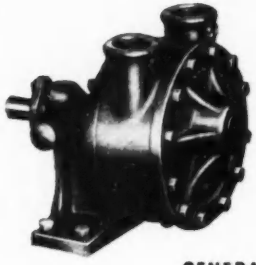
**HARGRAVE** *Tested Tools*
**THE CINCINNATI TOOL COMPANY**

**designed for carefree performance...**



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**GENERAL PURPOSE PUMPS**

• Low first cost • Negligible maintenance • Compact design • Operates dependably in either direction of rotation • Capacities to 200 g.p.m. • Pressures to 100 p.s.i. • Direct drive, slow-speed V-belt units and stripped models

**Write for Model C bulletin.**

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939 East 95th Street . Chicago 19, Illinois . Phone RE 4-7420

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JOHNSON BEARING SERVICE means deliveries ON TIME, too
PRODUCTION schedules of the automotive industry are fully appreciated at Johnson Bronze. Large plant facilities are devoted entirely to automotive bearings and are operated on time schedules which give you the bearings you need when you want them. On quality, precision and delivery, Johnson Bronze has become an important source of supply for leading automobile manufacturers.
You will find Johnson Engineers willing to help you decide which type bearing is best suited and to design it to the application. Write, wire or call for an appointment today!
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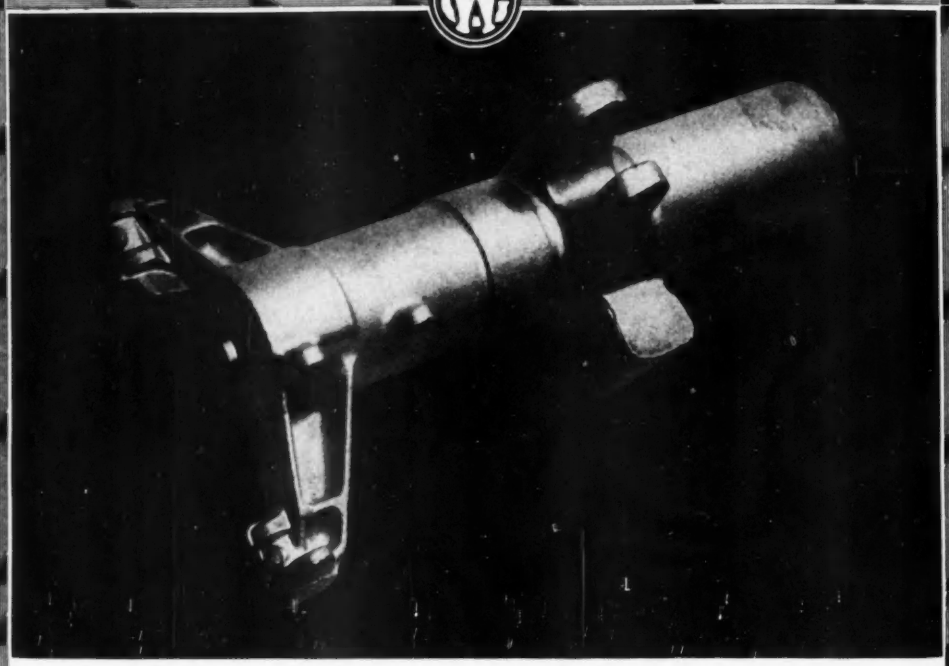
SLEEVE BEARING HEADQUARTERS
625 SOUTH MILL STREET • NEW CASTLE, PA.



*Aircraft Landing Gear Forging*—Weighing 275 pounds, this part is typical of the many large intricate forgings required on military and transport aircraft. Wyman-Gordon has specialized in aircraft forgings since the beginning of the aviation industry, and today produces the largest volume of the greatest variety of these important parts—forgings from five to one thousand pounds. And—there is no substitute for Wyman-Gordon experience.

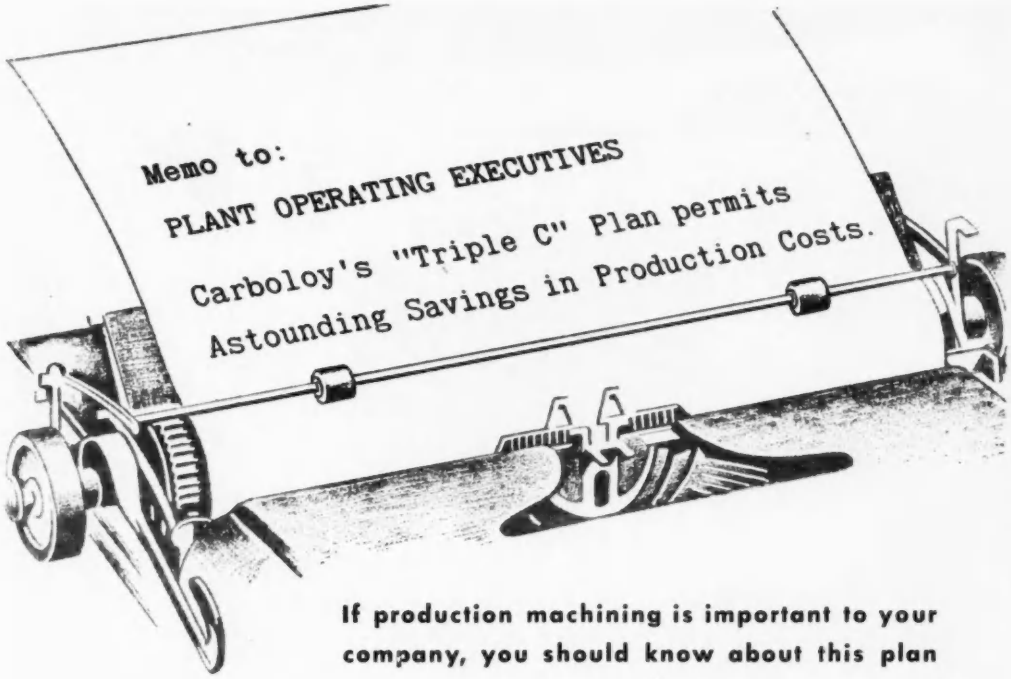
*Standard of the Industry for More Than Sixty Years*

# WYMAN-GORDON

***Forgings of Aluminum, Magnesium, Steel***

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS - - - DETROIT, MICHIGAN




## If production machining is important to your company, you should know about this plan

CARBOLOY COMPANY'S plan of Coordinated Carbide Control ("Triple C") goes far beyond merely realizing savings in tool costs through the use of cemented carbides.

It is actually a carefully developed program that can substantially reduce manufacturing costs, increase production and eliminate waste of time and materials. It can do much to help lower your company's break-even point in these days of high fixed and variable costs.

This program deals with problems which are of vital concern to you, if machining is an important part of your company's production. It offers a *quick and sure* way to effect major savings strictly within the production area.

### "Triple C" is field-tested and workable

Simply defined, "Triple C" is a plan, based on years of field experience, for coordinating all phases of carbide tool use in your plant. Wherever the program has been put into operation, it has achieved amazing results . . . without increase in man-hours, without plant expansion or added major capital expenditure.

"Triple C" has worked for others. It can probably work as successfully for your company.

### Here is a typical case

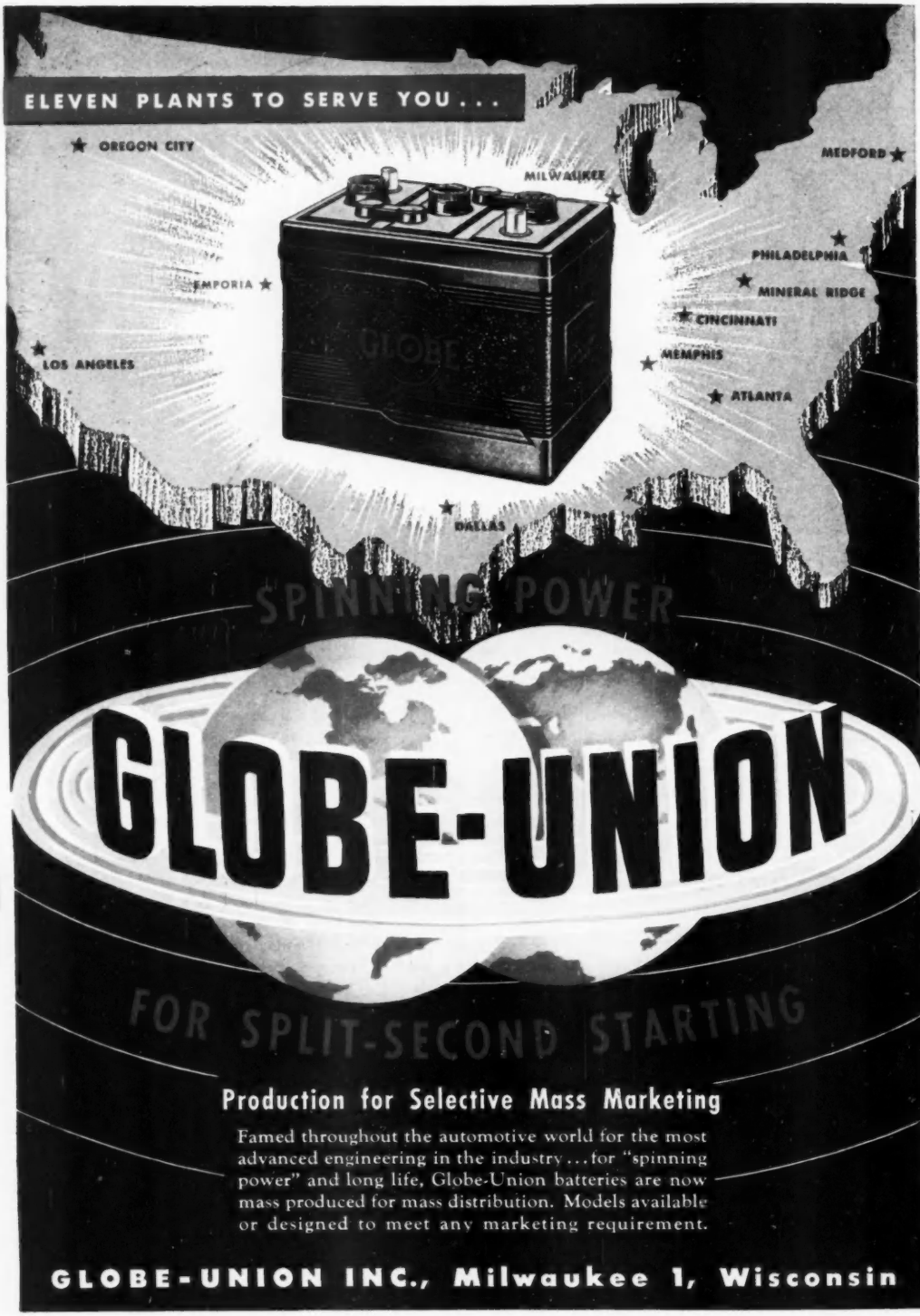
"The effect of rising costs in labor and raw materials has been substantially offset here by the application of carbide tooling on a coordinated plant-wide basis. Production savings realized by carbide-tipped cutting tools have been an important factor in helping to maintain product quality at current market prices."

*—Large machine tool manufacturer*

**CARBOLOY COMPANY, INC.**
**11151 E. 8 Mile Street, Detroit 32, Michigan**

**CARBOLOY®**
CEMENTED CARBIDE

COORDINATED CARBIDE CONTROL
THE CARBOLOY "TRIPLE C" PLAN
FOR EVEN GREATER SAVINGS WITH CARBIDES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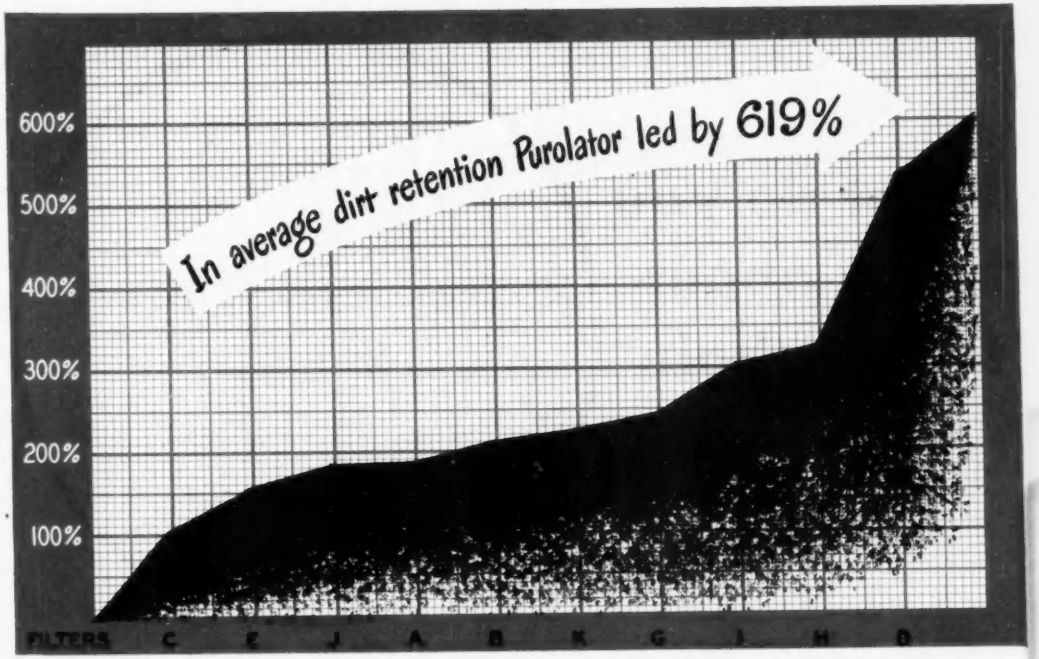
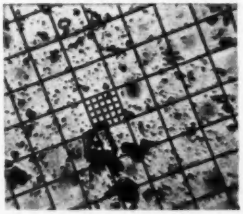


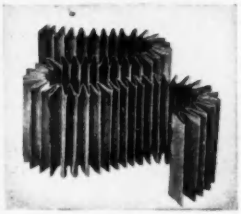

# No wild claims – just *PROOF!*

**COMPETITIVE TESTS SHOW PUROLATOR'S MICRONIC OIL FILTER SIDETRACKS AN AVERAGE OF 290% MORE ABRASIVES THAN COMPARABLE SIZE FILTERS!**

**THESE ENGINEERING "EXTRAS" TELL HOW!**



**Filters Micronic Particles.** In Government tests on oil filters, with approved Test Dust containing graded dust ranging from one micron on up, Purolator's *specially designed Micronic element* filtered 97.8% on the very first pass-through.



**5 Times Greater Filtering Area.** The revolutionary accordion-pleated design of the Purolator Micronic Filter provides an area 5 times that of old-style filters. "Open area," too, is much greater than that of comparable size filters.

PUROLATOR
MICRONIC OIL FILTER
"FIRST IN THE FIELD OF FILTERING"

● To create additional acceptance for engines and vehicles . . . equip them with "the most efficient oil filter."

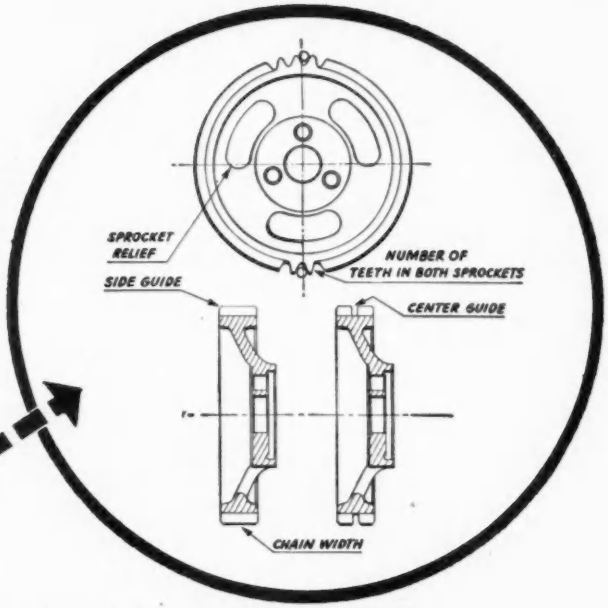
That, of course, means a Purolator Micronic Filter . . . proved by test to be far ahead of its nearest competitor in all-important dirt-retention (due to the exclusive element that traps micronic particles as small as .000039 of an inch—and the extended area design shown at the left).

Purolator removes *all* the abrasives from the oil stream . . . thus saving wear on pistons, bearings, cylinder walls and other vital parts. Yet it *leaves* in the oil any additives placed there for greater lubrication efficiency. Other types of filters often remove these important additives.

Consult our highly experienced engineering staff about your specific filtering problem. And be sure to write for any additional data and technical information on the Purolator Micronic Filter that you would like to have.

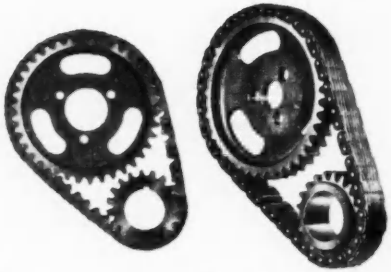
**PUROLATOR PRODUCTS INC.,**
**Newark 2, New Jersey and Windsor, Ontario, Canada**

# What do you know about timing chain drives?

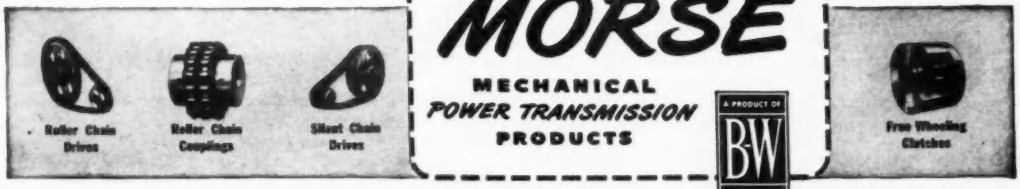



**1. Do you know** that Morse timing chain drives are used in more automobiles than any other make? Do you know that new developments are constantly being made to improve such drives? And performance can often be improved by seeing Morse engineers before you specify any timing chain? It will pay you well to look into the service Morse Chain provides for design, production, performance and quality of automotive timing chains.

**2. Do you know** that Morse engineers can aid you on sprocket-tooth combination in relation to chain life; guide position; lubrication methods; chain width; placement and size of sprocket reliefs and sprocket material selection? *These points, and many more, are part of Morse Chain's service to you in developing and improving automotive timing drives.*



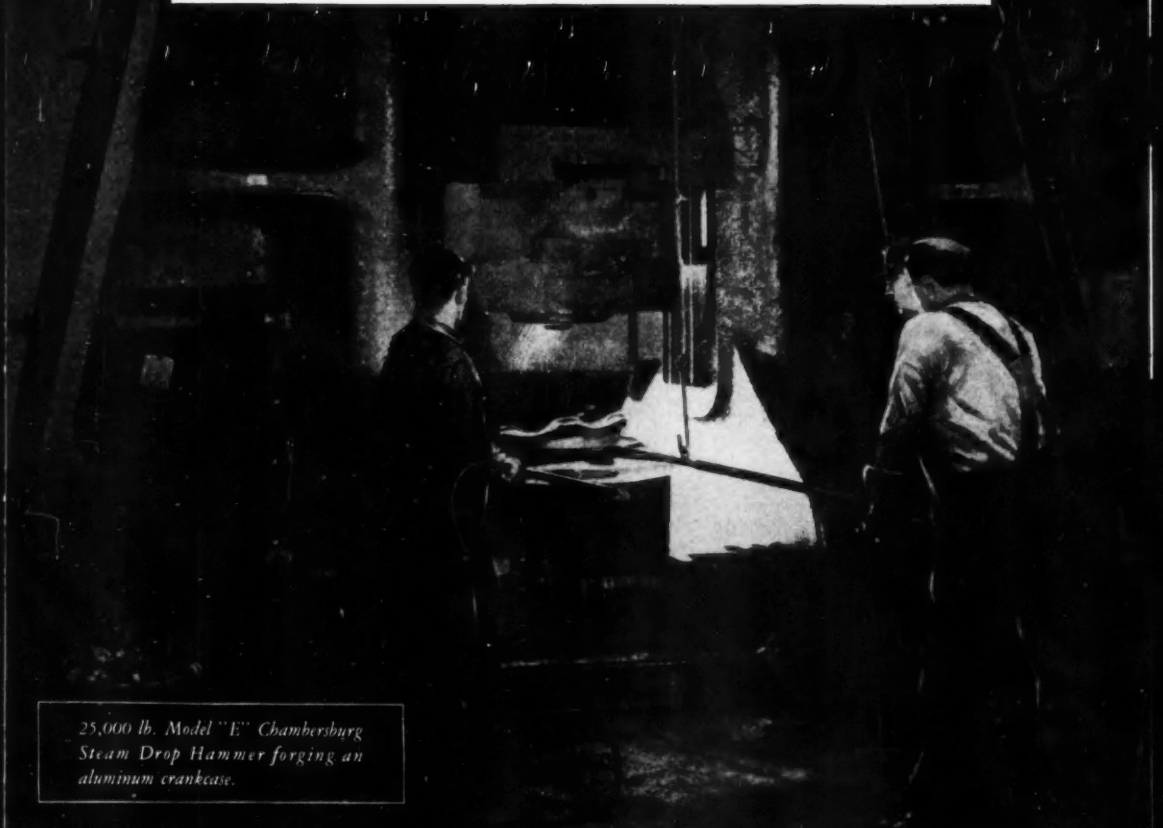
**3. Every element** in a chain drive is of equal importance in attaining maximum performance. Have Morse review your *complete* timing-drive situation. As automotive chain specialists, Morse can evaluate all factors. Volume production in two plants, means your requirements get full attention. Contact Dept. 321 Morse Chain Company, Detroit 8, Michigan.




MORSE CHAIN COMPANY • DETROIT 8, MICHIGAN

# CHAMBERSBURG

**The performance of the world's most efficient drop hammer—the Chambersburg Model "E"—rests squarely on scientific engineering checked by a half-century of forge shop experience.**



*25,000 lb. Model "E" Chambersburg Steam Drop Hammer forging an aluminum crankcase.*

CHAMBERSBURG ENGINEERING CO.

CHAMBERSBURG IMPACT

CHAMBERSBURG, PA.

NASH DASH PANELS ARE COATED WITH LOGOQUANT*

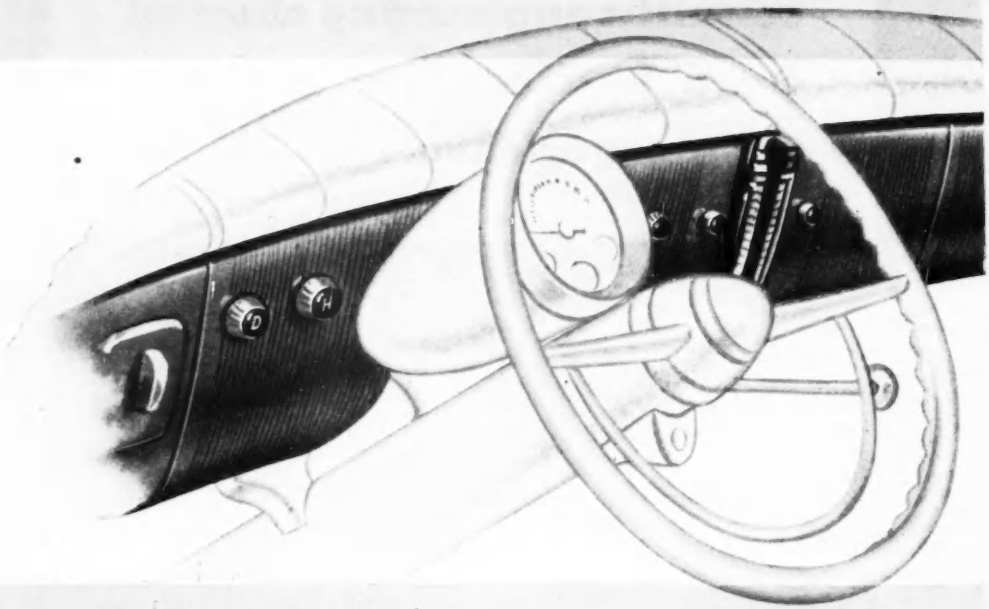
General American is the only major plastics manufacturer currently equipped to use—and actually using—lustrous, protective Logoquant. This new type of coating greatly increases the resistance of plastics to chemicals and abrasives. It gives a bright, glowing finish of unusually high clarity.

NO COLOR MATCHING PROBLEM!
NO NEED FOR CODING BATCHES!

The three parts of the Nash panel are always perfectly matched for color, whether they are molded from the same batch of material or not. The facilities of General American's large, completely equipped new paint shop are available to all customers who require true, perfectly-matched, long-lasting colors.

*handsome!*

Nash



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AND MANY OTHER PRACTICAL PLASTIC PIECES

**Plastics Division**

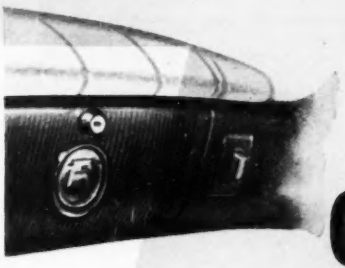
PLASTICS DIVISION GENERAL AMERICAN TRADE MARK

**GENERAL AMERICAN**

*rugged!*

# DASH PANEL

*molded and painted by*



## General American

### NEW—LARGE, COLOR-MATCHED POLYSTYRENE PANELS MADE POSSIBLE FOR INDUSTRY

Nobody believed it could be done! "It's impossible," they said, "to get dimensional stability when molding a radio dial scale and other compound curvatures into single panels of polystyrene." But take a look at the ultra-violet resistant polystyrene dash panel of the handsome, new Nash. See its high-gloss three-dimensional effect beauty. It's the first successful large size polystyrene part for the automotive industry . . . molded by General American and coated with Logoquant.*

The same kind of creative thinking and research which produced this job is available to all General American customers. At General American you can use equipment such as 2 to 48 oz. injection presses and 100 to 2000 ton compression presses (with 71" x 74" platen areas). Complete finishing and assembling facilities are also at your disposal.

TECHNICAL DATA: Three molded parts—glove-box door, instrument panel and radio panel—are made on 16 oz. and 22 oz. injection presses. Eight molds produce the parts for both left-hand and right-hand drive cars. Tools are designed and built by General American.

**TRANSPORTATION CORPORATION**

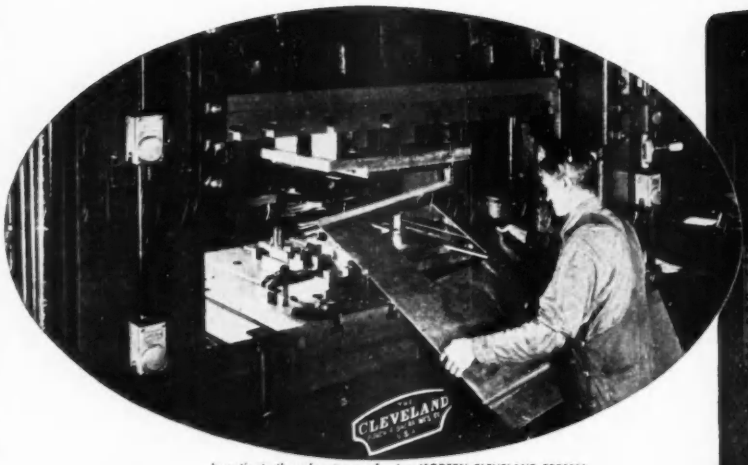
**135 South LaSalle Street, Chicago 90, Illinois • New York, 10 E. 49th St. • Los Angeles, Richfield Bldg.**

# CLEVELAND'S ARE RUGGED

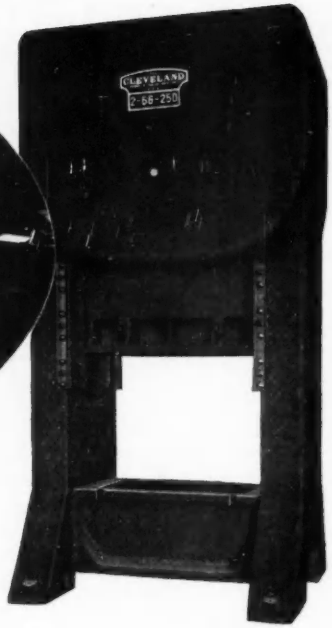
## *Accuracy Assured*

Modern Cleveland Presses have been used for years at the main plant of the Iron Fireman Manufacturing Co. in Cleveland, to stamp out parts varying from 7 to 20 gauge. The men at the Iron Fireman who are responsible for the steady flow of accurate parts have found, by experience, that Modern Cleveland Presses are ideally suited for the production of large and irregular shapes of heavy gauge material, as well as for difficult light gauge work. The ability of Cleveland Presses to economically produce the diversity of stampings used in the construction of Iron Fireman products is due, in large measure, to the sound designing of Modern Cleveland Presses, plus their rugged construction which assures the utmost rigidity and constant accuracy of alignment between the slide and the bed, thereby eliminating undue deflection under load.

CLEVELAND offers higher manufacturing efficiency at lower operating cost with a complete range of fourteen types of Presses in sizes and capacities to meet your particular requirements.




Investigate the advantages of using MODERN CLEVELAND PRESSES equipped with the new (patented) DRUM TYPE CLUTCH & BRAKE.




Cleveland Two Point Press equipped with electrically controlled air operated friction clutch. Stroke of slide 12", adjustment of slide 5", shut height 20", strokes per minute 20, area of bed 40" x 66", capacity 250 tons.

IRON FIREMAN FURNACE TOP —7 gauge steel

IRON FIREMAN ENCLOSURE—for bin-fed stoker, 20 gauge steel

IRON FIREMAN BOTTOM—for domestic stoker, 7 gauge steel

*WRITE FOR BULLETIN (45)*

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OFFICES AT:
NEW YORK.... CHICAGO
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**THE CLEVELAND PUNCH & SHEAR WORKS CO.**
U. S. A.
Established 1880

**FABRICATING TOOLS**

**CLEVELAND 14, OHIO**

• • • • • • **POWER PRESSES** • • • • • •

# SCHWITZER-CUMMINS SUPERCHARGERS

**POSITIVE DISPLACEMENT**
...Sizes to Supercharge Engines 50 H.P. to 500 H.P. Rating — Pressure Ratios 2 to 1 Maximum.

- OIL PUMPS
- WATER PUMPS
- COOLING FANS
- SUPERCHARGERS
- VIBRATION DAMPENERS
- AUTOMATIC SHAFT SEALS

THIRTY YEARS of intensive work on the varied problems related to the development and manufacture of superchargers for all types of internal combustion engines has developed here at Schwitzer-Cummins Company a unique ability to select the best in type of equipment and the "know how" to apply it for the utmost in compactness, efficiency and reliability. Final unit production cost is our prime consideration at all times.

We shall appreciate the opportunity to study your supercharger requirements, either for a new engine design or to improve present performance. We can place at your disposal qualified technical experience and knowledge of proven and latest developments in this field. Our long service to the industry embraces the designing and building of superchargers and their drives for marine and stationary engines—for buses, trucks and locomotives—for earth movers, power generators, pumping, hoisting, and construction equipment and many specialized uses—gasoline and Diesel, two cycle and four cycle, large and small.

Illustrated here is an unusual combination of supercharger and water pump for a six cylinder, two cycle Diesel with automotive engine type bearings, pressure lubricated from engine oil pump.

Whatever your requirement or application, we feel we have something for it. May we serve your needs?

**ALL IMPORTANT PARTS**
are manufactured in our own plants under direction of our supercharger engineers for full interchangeability and the utmost simplicity on service requirements.

More power and improved performance from your engine with compactness, simplicity and low cost. Manufactured to our design or to suit requirements peculiar to your own.

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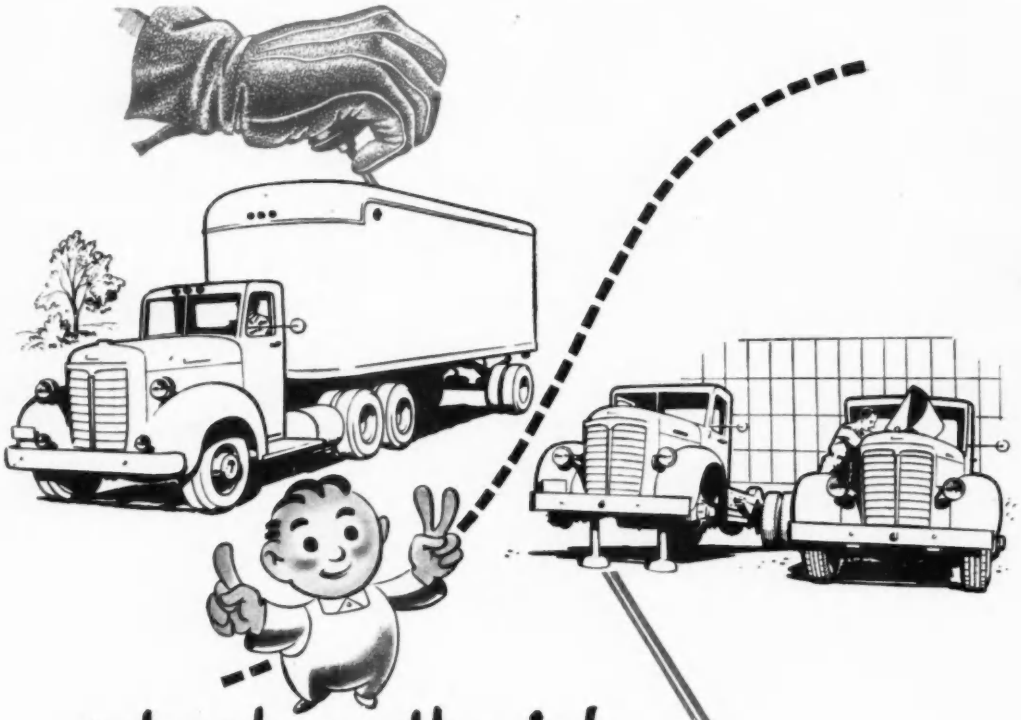


# a truck on the job is worth two in the shop

. . . or, to carry the old adage even further, a truck on the road is worth *a whole fleet* in the shop. The rigs you design make money only . . . when they operate with a minimum of maintenance and repair.

Real transmission performance . . . thousands of miles of rugged road service without major repairs or parts replacement . . . is the experience of fleet owners who have standardized on Fuller.

Long wear-life and low maintenance are inbuilt characteristics of Fuller Transmissions . . . characteristics that give you extra miles and extra profits. Write for the catalog which describes each of Fuller's proved-in-the-field transmissions.

**FULLER MANUFACTURING COMPANY, TRANSMISSION DIVISION**
**KALAMAZOO 13F, MICHIGAN**
*Unit Drop Forge Division, Milwaukee 1, Wisconsin*

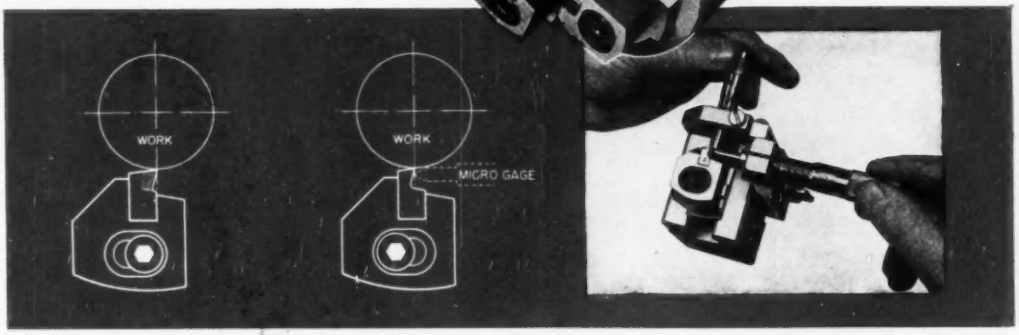
**WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS)**
*1060 East 11th Street, Oakland 6, California*

Fuller TRANSMISSIONS

# NO OTHER BLADE CHASER

## has this two-way adjustment— for both Diameter and Wear

The new Adjustable Blade Chasers, applied to standard Vers-O-Tool heads, are positioned to the specified cutting size by positive, quick diametric adjustment of the head.




New chaser, with block offset to left—cutting edge up to proper working position. At least six regrinds available.

Reground chaser, with block offset to right to compensate for wear—cutting edge still up to proper position.

The double-barrel micrometer gauge, made famous for checking Namco Circular Chasers, is equally applicable for use with the new Adjustable Blade Chasers. It provides accurate determination of the exact amount of metal to be removed in grinding—and a positive check of the reground blades.

The cutting edge is *always* up to the center line—and there's no excuse for inaccurate grinding. The exclusive Namco Double-Barrel Micrometer Gauge takes care of that.

These are two important advantages of the new Namco Adjustable Blade Chasers, designed for use on standard DR, DS and DBS circular chaser heads. But there are other advantages, too.

Adjustable Blade Chasers will provide at least six regrinds—twice as many as conventional blade chasers. And they're so economical, you can use them on short-run jobs, broadening the use of Vers-O-Tool heads to *all* threading work in your shop.

These new Adjustable Blade Chasers, with their holders, are interchangeable with the famous Namco Circular Chasers which are ideal for the longer runs—and they're positioned to the cutting size in the same way, by the quick, positive diametric adjustment of the Vers-O-Tool.

May we show you how they'll increase your threading profits?

***Ask for Catalog D-48***

**The NATIONAL ACME CO.**

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**Acme-Gridley 4-6 and 8 Spindle Bar and Chucking Automatics • Single Spindle Automatics • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing**

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Reeves Army Twill is a thoroughly tested, high-quality, combed cotton, Sanforized, fabric. (Residual shrinkage is less than 1%.) Over 100 million yards have been delivered to the Armed Services—exceeding rigid Government specifications. It comes in a wide range of vat-dyed colors fast to sun, water and perspiration. It is one of many durable fabrics made by Reeves for industrial purposes. Write for full details concerning your industry.

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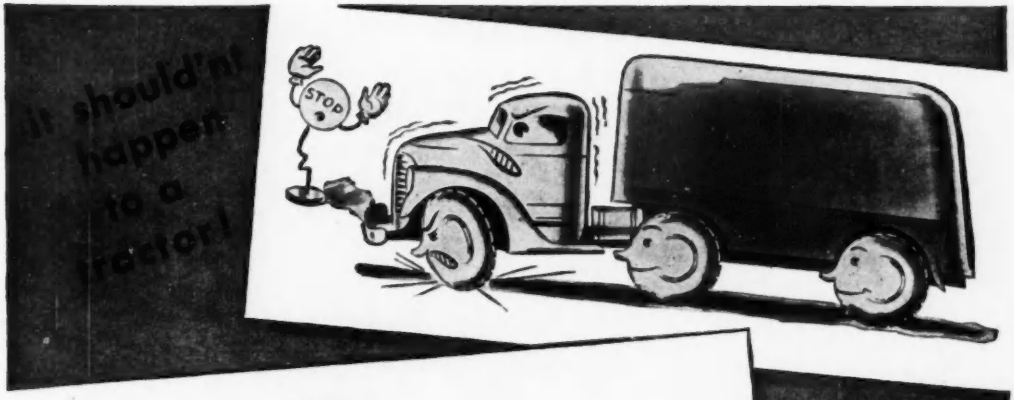


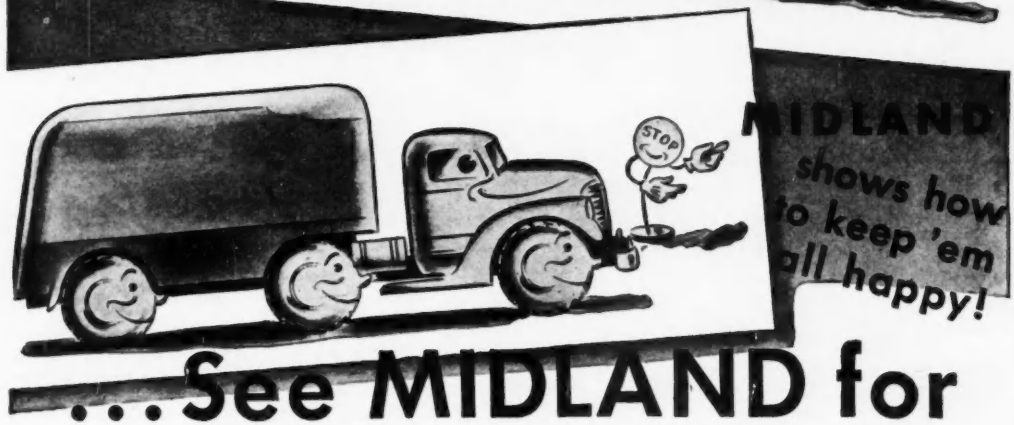


# ...See MIDLAND for

## SYNCHRON-AIR BRAKE SYSTEM

***PROVIDES:*** Synchronized air brake application and release on all axles • Selective front axle brake control automatically and proportionately graduated between stations • Option to apply and release a predetermined proportion of tractor rear axle brakes simultaneously with trailer brakes through hand brake valve • High capacity trailer emergency relay valve • Single unit tank and emergency relay valve.

## VACUUM SYNCHRONIZING VALVE

***PROVIDES:*** Synchronized tractor vacuum hydraulic and trailer vacuum brake application and release • Uniform control under all weather conditions • Single unit trailer tank and relay valve • Easily installed • Improved brake lining life.

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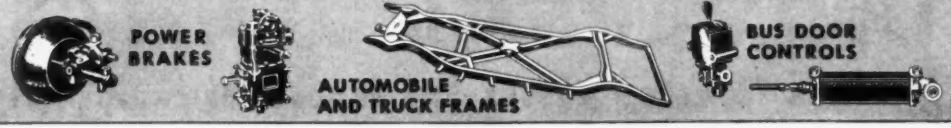
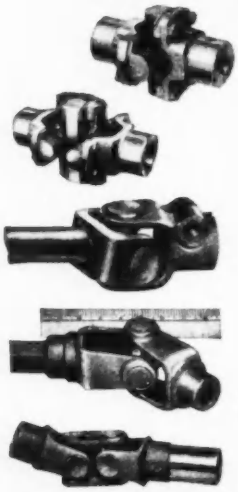
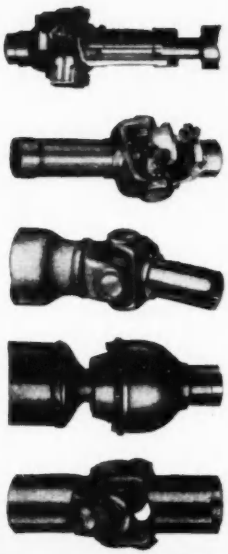




MECHANICS makes the most complete line of SIZES and TYPES of Roller Bearing UNIVERSAL JOINTS — for every kind of application. Sizes range from 200 to 50,000 foot pounds torque, with a wide variety of end connections and shaft arrangements. Millions of cars, trucks, busses, tractors, farm, construction and industrial machines, and aircraft of all types benefit from design and manufacturing advantages of MECHANICS (lifetime or once-a- season lubricated) Roller Bearing UNIVERSAL JOINTS. In addition to conventional applications, we make joints for tractor steering and many special uses.

Let our engineers show you how sturdy MECHANICS Roller Bearing UNIVERSAL JOINTS can help increase the utility and dependability of your product.



**MECHANICS UNIVERSAL JOINT DIVISION**

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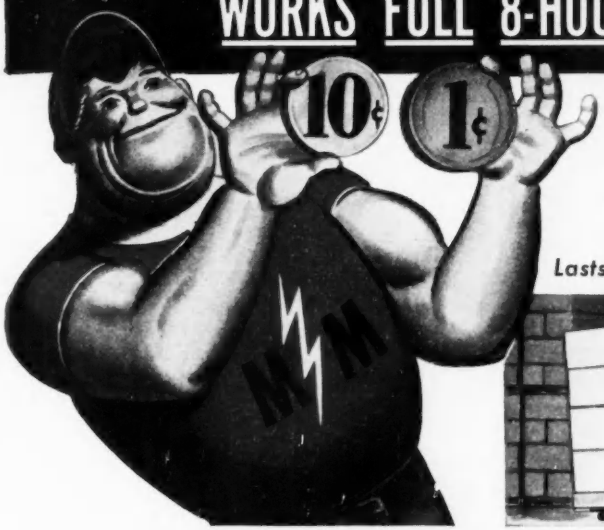
# MECHANICS

## *Roller Bearing* UNIVERSAL JOINTS

**For Cars • Trucks • Busses and Industrial Equipment**

# AMAZING AUTOMATIC ELECTRIC TRUCK CUTS HANDLING COSTS IN HALF

## WORKS FULL 8-HOUR DAY FOR 11c!*

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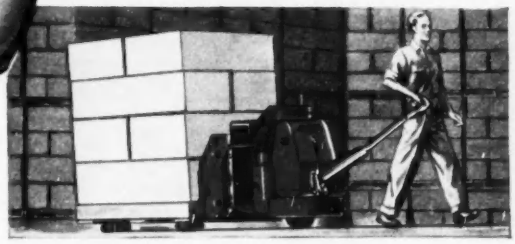
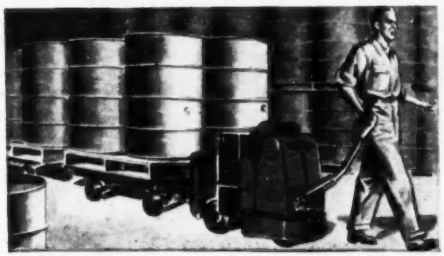
*Lasts Many, Many Trouble-Free Years!*



## SAVES USERS THOUSANDS OF DOLLARS



IMAGINE an electric truck that works a full 8-hour day for as little as *11c a day battery charging cost . . . and cuts your handling costs in half . . . savings amounting to thousands of dollars, depending on the tonnage you move in your plant.

That's what amazing Automatic Transporter will do for you . . . lift and move 2,000, 4,000 and 6,000 pound loads with feather-touch of thumb on electric control buttons.

Note its effortless operation in the picture above. Could anything be easier, more efficient, time saving? And how it "lightens labor's load." Muscle Mike, the brawny midget of electrical power in its motor does all the work. One man does more with less effort than three hand truckers, releasing labor for more productive work.

Transporter's bigger sister, the new Tilting Type Transtacker, also STACKS your product . . . gives you faster, safer load spotting and cradling . . . with a single lift of 64 inches and a telescopic lift of 120 inches.

Here's an extra bonus of free storage space to heights manual handling couldn't touch. See the picture to the left . . . *picture* the dollars saved it will bank for you. Works long, steady on same battery as Transporter . . . operating cost is fantastically low.

Transtractor, shown lower left, will push or pull 6000 pounds all day long or up to 20,000 pounds intermittently. Again, finger-tip control, low cost Transporter battery operation.

Either one, or all of these Transtriplet miracle electric trucks will do a material handling job that will total up to savings that will astound you . . . with operating cost a minor factor. Let us tell you, and show you more in our free material handling catalog. Mail coupon.

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DIV. OF THE YALE & TOWNE MFG. CO.
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Send me complete facts and FREE catalog describing fully ( ) Transporter ( ) Transtacker ( ) Transtractor, and the material handling savings they can bring my business.

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MAKERS OF FERRO-ALLOYS

CHEMICALS AND METALS

# *Here's alluring style...plus!*

## AND THE PLUS IS PRECISELY ENGINEERED UTILITY!

A steering wheel for a new motor car! It has superbly alluring style, matching the sleek lines of the car itself. A design problem ideally suited to Inland engineers, working in close collaboration with the stylists and engineers of the car manufacturer. You see the solution above.

And it reveals more than beauty. For utility, think of the wheel in the driver's hands. And remember, underneath the graceful form there's amazingly rugged strength for safety . . . prescribed by Inland engineers.

Since 1922 Inland has pioneered in better bonding of rubber, plastics and metals. It has originated and developed exclusive methods, machines, tools and compounds to carry out these processes. And Inland always controls production with laboratory precision. That's why steering wheels or any products by Inland set top standards for value in service.

**INLAND MANUFACTURING DIV.**
General Motors Corporation, Dayton, Ohio

*Steering Wheels by* INLAND MANUFACTURING

*RUBBER • METAL • PLASTIC PRODUCTS*

**PRECISION-BUILT BY SPECIALISTS FOR SMOOTH, QUIET OPERATION**

# Redmond MICROMOTORS

**TYPE CU:** 1/10th H.P., A.C., 4-Pole, Shaded Pole, 1550 R.P.M.

**TYPE BT:** 1/30th H.P., A.C., 2-Pole, Shaded Pole, 3000 R.P.M.

**TYPE BL:** 1/40th H.P., A.C., 2-Pole, Shaded Pole, 3000 R.P.M.

**BLOWER 3866:** 150 C.F.M., A.C., With Single Air Outlet

## Over 140 Standard Models . . . 23 Different Types
## D.C. or A.C. up to 1/10th Horsepower

Get your hands on a Redmond Micromotor . . . any model, any type to suit your particular application. You'll like the solid, substantial "feel" of it . . . the apparent fine care with which it was assembled and finished. You'll approve its smart, crisp appearance . . . its sturdy, rugged construction. And, as you check its details point for point against your own low-range power requirements, you'll fully appreciate the many advanced engineering features that have been incorporated in its design. They're precision features developed by Redmond small motor specialists to give you smoother, quieter operation and maximum long-life performance at minimum cost.

Yes, get your hands on a Redmond Micromotor. Let Redmond "Customer Engineering Service" help you in its selection and application. Then see for yourself what a wonderful big difference the right small motor can make in the life, performance, and efficiency of your product.

*Write today for the complete Redmond Catalog covering DC and AC MicroMotors, blowers, and speed controllers.*

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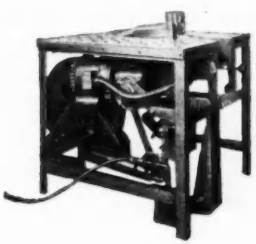
(Advertisement)

# HIGHLY SKILLED PRODUCTION "WORKER" SEEKS NEW OPPORTUNITIES



Imagine a mechanism that drapes steel strapping around wire coils, packages, or sub-assemblies . . . tensions, seals and cuts it in one continuous operation . . . at speeds limited only by the rapidity with which these objects can be fed!

Such a machine, with several adaptations, has been perfected by engineers of Signode Steel Strapping Company.

Originally developed as an aid to tying coils of steel strap in our own plant, its performance was so satisfactory that it was called to the attention of production managers in several of our customers' plants . . . in the rubber industry, in automobile manufacturing, in steel production.

Today a number of these Signode power strapping machines are in operation in those plants, ringing up new production records . . . performing production line operations mechanically that formerly had to be done slowly by hand.

Frankly, we don't know all the things this new machine can do. We do know, however, that there are many places in mass production industries where small parts must be tied together prior to assembly, and where this machine, properly used, could speed work, save labor, cut costs. One of its important features is that it fits easily into a conveyor line, or permits the setting up of a conveyor line. Another is that the tension of the strap is adjustable—moderate tension for rubber hose or electrodes, full tension for automobile springs or heavy packages. Its performance is automatic, or partially automatic, depending on the nature of the process and the conditions under which it is used; and it functions efficiently on objects of small cross section.

We believe there are a number of men in industry with the vision to see how these machines might be used in their assembly line or volume packaging operations . . . to do an old job in a new and better way. To such men we extend the invitation to write for complete information.

**SIGNODE STEEL STRAPPING COMPANY**
**2610 N. Western Avenue, Chicago 47, Illinois**

# What does this name mean to YOU?

"You can't tell the players without a program" . . . This familiar stadium ballyhoo can apply as well to a manufactured product. Only through the understanding of the quality component parts can the stellar performance of the finished product be explained.

Such a "line-up" would reveal STEECHAN* glass-run window channel and weatherstripping as dependable supporting factors in the success of the outstanding stars in the automotive industry. The Standard Products Company, the world's largest manufacturer of quality glass-run window channel and weatherstripping (STEECHAN*), has long been recognized as a dependable supplier to manufacturers of fine motor cars, motor trucks, buses and many other products.

This reputation for dependable supply, careful engineering and quality production extends to all Standard Products: door locks, remote controls, and checks; molded and extruded rubber parts; and thermo-plastics. Each contributes to the success of fine finished products.

*Trade name of the world's finest glass-run window channel and weatherstripping.*

THE MARK OF A SUPERIOR PRODUCT

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# ARE YOU "*FISHING*" FOR MORE ECONOMICAL METALS?

*Parts for a Penn Reel. Many of these are standardized and are interchangeable regardless of type or size of reel.*

GREETINGS to all fishermen from Revere and the Penn Fishing Tackle Mfg. Co.! Revere is glad you like Penn Reels, for though you may not realize it, they contain several different Revere Metals, each one chosen to match specific requirements. A reel is a complex machine, and it has to be well designed and accurately made of fine materials if it is to serve you well. Penn specializes in salt water reels, and during the past three years alone has bought the following from Revere:

*Brass Strip, 11 different items, for 12 parts*
*Brass Rod, 14 different items, for 13 parts*
*Phosphor Bronze Strip, 6 different items, for one part*
*Brass Tube, one item for one part*

Brass is specified for its easy workability, corrosion resistance, and excellent plating qualities; Phosphor Bronze for its wear resistance as used in the drag ratchet dog in several sizes of reels. Complete parts for a reel are shown above; some of them, making use of Revere Metals include: handle, level wind worm, pinion yoke, gear plate with drag ratchet, drag adjusting star, spool bearing, front and back plate rings . . . Revere is always delighted when its products contribute to the enjoyment of sport; it gives us a sense of added accomplishment, because in most cases the Revere Metals have utilitarian end uses. But whatever it is you make, whether for sport or not, remember that it is our business to serve you with fine metals, and to collaborate with you in your search for economy in the specification and use of those metals.

## For Automotive Engineers

In this day of rising costs, every industry is seeking more efficient, more economical materials.

This is one of a series of messages showing how engineers in other industries are cutting costs or improving their manufacturing techniques with Revere Metals.

We hope that it may contain the germ of an idea that will be helpful to you.

**REVERE**

**COPPER AND BRASS INCORPORATED**

*Founded by Paul Revere in 1801*

230 Park Avenue, New York 17, New York

*Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; New Bedford, Mass.; Rome, N. Y. — Sales Offices in Principal Cities, Distributors Everywhere.*

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# NATIONAL OIL SEAL LOGBOOK

## NEW OIL SEAL DEVELOPMENTS SOLVE EXTREME PROBLEMS

A practical, economical answer to many modern sealing problems is found in newly-developed shaft seals with sealing members of compounded synthetics. Common-sense chemistry, engineering, tooling and production have broadened the usefulness of these seals to where they account for a large percentage of all oil seals in use today.

### ADVANTAGES AND LIMITATIONS OF THE NATIONAL 50,000-S SYNTECH OIL SEAL

The National 50,000-S (Fig. 1) is a metal encased, spring loaded single member Syntech Seal. Correct compounding of the synthetic rubber sealing member has made these seals capable of continuous operation with zero leakage at temperatures exceeding 300°F, speeds of 3600 F.P.M. and runout up to .030 indicator reading. However, these seals should only be used where there is sufficient and constant lubrication within the sealing area.

Figure 1

**Sensitive Sealing Members**

An important factor in this outstanding zero-leakage performance is the high sensitivity of the synthetic sealing member to the shaft surface. If shaft surfaces are finished to 15 to 20 R.M.S., or finer, and operating conditions are good, a seal life of several years may be expected. However, these seals are performing well on shaft finishes of 30 to 60 R.M.S. Such durability and performance makes these seals ideal for engines, pinions, transmissions and high-speed gear assemblies of all types.

**Typical Application**

In automotive transmissions such as shown in the section drawing (Fig. 2) the National 50,000-S is ideal. In such applications the shaft often turns at over 4000 R.P.M. and all types of extreme pressure lubricants are present. Many times there is a considerable head of oil at the seal and temperatures reach 300°F.

**On Heavy Duty Equipment**

Usefulness of the synthetic rubber seal is not limited to high-speed, precision-built machines. More and more these seals are replacing cumbersome "face" type or other seals on heavy duty equipment such as road graders, tractors and farm implements. The National Syntech Seal should be considered for any application where temperatures are over 200°F, speeds over 2000 R.P.M. or runout over .005 indicator reading.

A marked advantage of synthetic spring-loaded seals is their wide availability. These designs are very well tooled, and synthetic-rubber National Oil Seals are available from stock in many types and sizes. National Oil Seal Engineers, who have pioneered research in compounded synthetics for fluid sealing, invite your inquiry.

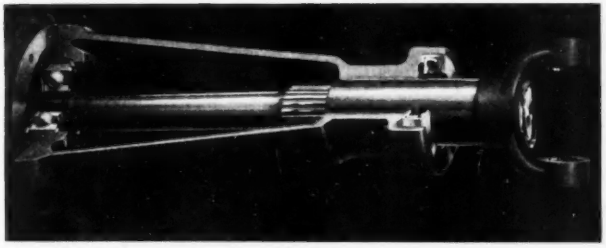

Figure 2

NATIONAL OIL AND FLUID SEALS

**NATIONAL MOTOR BEARING CO., INC.**

**General Offices:** Redwood City, California
**Plants:** Redwood City and Los Angeles, California; Van Wert, Ohio

**CALL IN A NATIONAL ENGINEER FOR RECOMMENDATIONS**

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**MILWAUKEE:** 647 West Virginia St., Marquette 8-8986.
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**WEST SPRINGFIELD, MASS.:** 1025 Elm Street, Springfield 2-1881.
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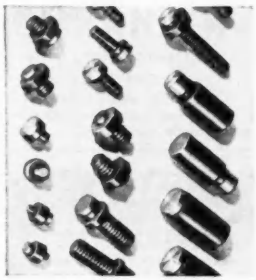

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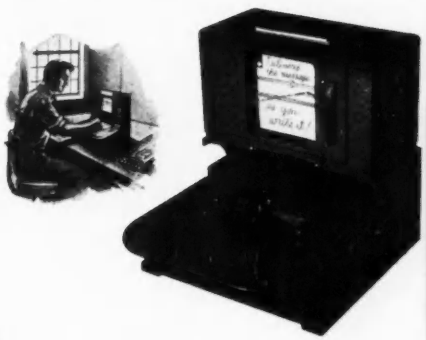

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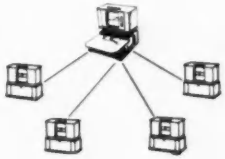

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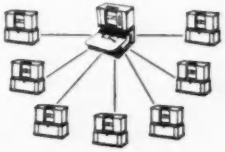

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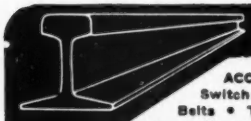

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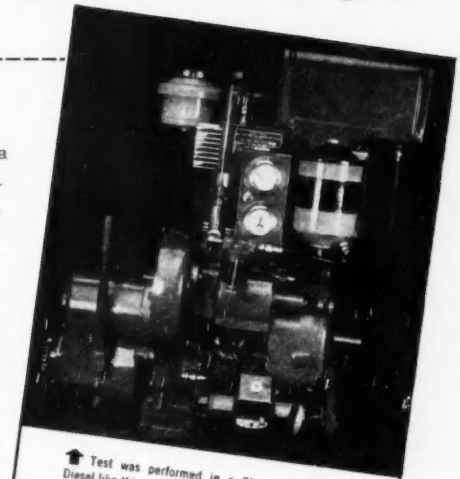
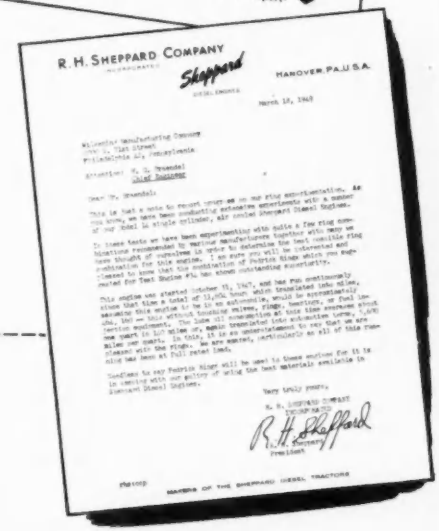


Test was performed in a Sheppard 1-cylinder Diesel like this.

Reproduction of R. H. Sheppard's letter reporting test results.



R. H. SHEPPARD COMPANY
Sheppard
HANOVER, PA., U.S.A.

March 15, 1949

Wilkening Manufacturing Company
Over G. Tait Street
Philadelphia 43, Pennsylvania

Attention: R. G. Brandel
Chief Engineer

Dear Mr. Brandel:

This is just a note to report once more on our ring experimentation. As you know, we have been conducting extensive experiments with a number of our Diesel 1-cylinder, air cooled Sheppard Diesel Engines.

In these tests we have been experimenting with quite a few ring combinations recommended by various manufacturers together with many combinations of ourselves in order to determine the best possible ring combination for this engine. I am sure you will be interested and pleased to know that the combination of Pedrick Rings which you supplied for Test Engine #34 has shown outstanding superiority.

This engine was started October 31, 1947, and has run continuously since that time a total of 11,604 hours which translated into miles, assuming this engine to be in an automobile, would be approximately ... this without touching the rings. The lube oil consumption at full rated load is ... one quart in 140 hours or, again translated into automotive terms, 5,600 miles per quart. In fact, it is an understatement to say that we are pleased with the rings. We are amazed, particularly as all of this running has been at full rated load.

Needless to say Pedrick Rings will be used in these engines for it is in keeping with our policy of using the best materials available in Sheppard Diesel Engines.

Very truly yours,

R. H. SHEPPARD COMPANY

R. H. Sheppard
President

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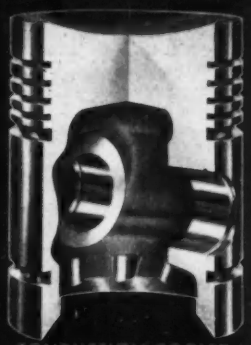

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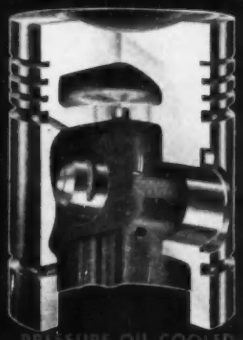

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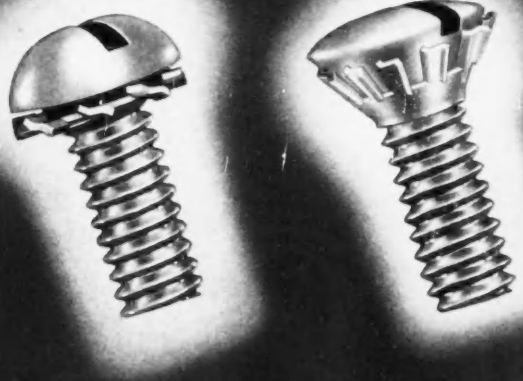
LOCK WASHER



Cash in on the multiple advantages of Everlock Screw-Washer Assemblies . . . quicker, lower cost assembly . . . automatic assurance that lock washers are applied where needed . . . simplified ordering and stocking . . . the unmatched protection of Everlock wide chisel edges.

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LOCK WASHER

FOR EVERY NEED

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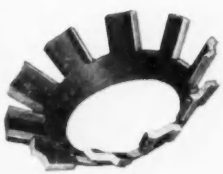

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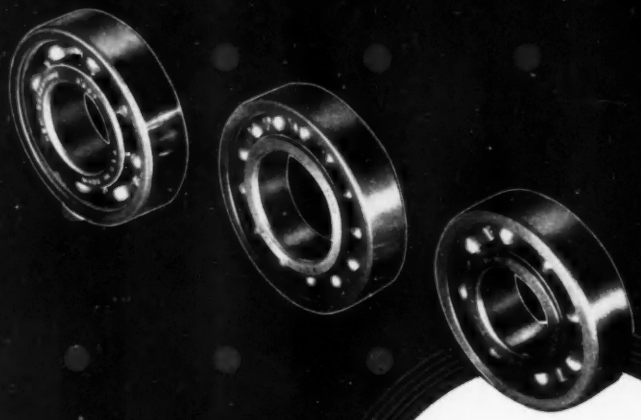

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